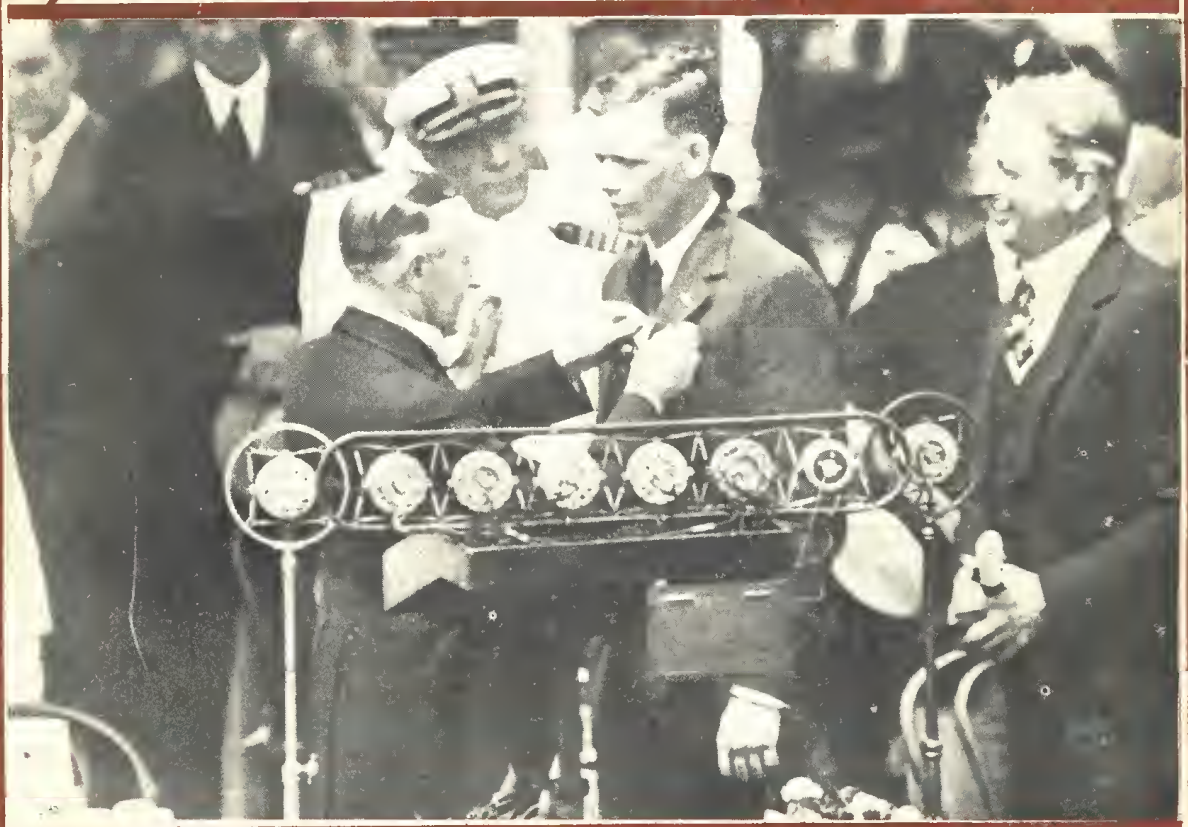
AVIATION

The Oldest American Aeronautical Magazine

JUNE 20, 1927 | Issued Weekly | PRICE 15 CENTS



President Coolidge Decorating Colonel Lindbergh with the Distinguished Flying Cross.

VOLUME XXII

NUMBER 25

SPECIAL FEATURES

THE PIONEER EARTH INDUCTOR COMPASS

HOW THE NEW YORK TO PARIS PLANE WAS BUILT

WRIGHT WHIRLWIND A RESULT OF SEVEN YEARS' DEVELOPMENT

AVIATION PUBLISHING CORPORATION

Editorial and Business Offices

250 WEST 57 STREET, NEW YORK

Publication Office

HIGHLAND, N. Y.

Entered as Second-Class Matter, Nov. 22, 1920, at the Post Office, at Highland, N. Y., under Act. of March 3, 1879

FOUR WORLD'S RECORDS *for the VOUGHT "CORSAIR"*

ALTITUDE
22,178 Feet

Lt G R Henderson, USN

A STANDARD Vought "Corsair" Naval Seaplane, on April 14, 1927, reached a record altitude of 22,178 feet, carrying a ballast load of 1102 lbs., included in the total useful load of 1640 lbs. Pilot G. R. Henderson, U.S.N., Pilot.

SPEED
100 Kilometers

Lt S W Callaway, USN

THE same seaplane, on April 25, 1927, with the same ballast load included in the 1675 lbs. useful load, averaged 147.263 miles per hour for 100 kilometers around a 25 kilometer closed course. Lieut. S. W. Callaway, U.S.N., Pilot.

SPEED
500 Kilometers

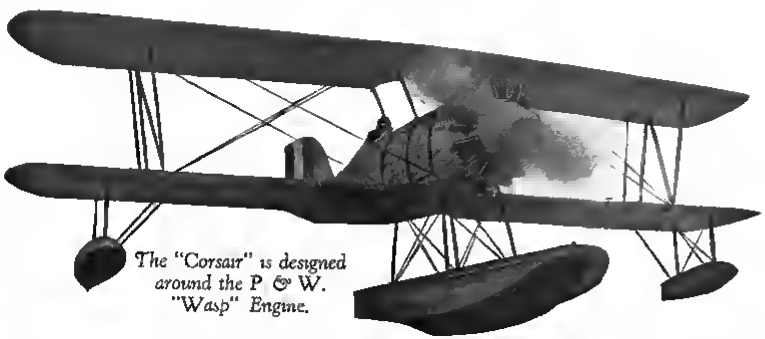
Lt J D Barner, USN

ON April 30, 1927, the same "Corsair" seaplane flying around the same short 25 kilometer course, averaged 136.023 miles per hour for 500 kilometers, carrying 1880 lbs. useful load including 1102 lbs. ballast. Lieut. J. D. Barner, U.S.N., Pilot.

SPEED
1000 Kilometers

Lt Rutledge Irvine, USN

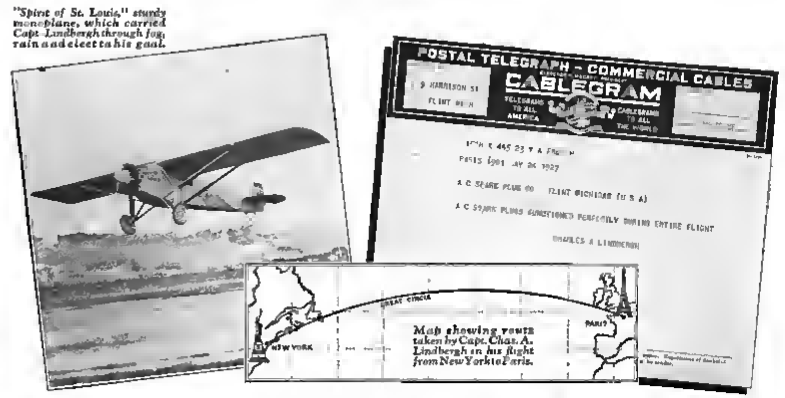
AND still a fourth World's Record was made by the same "Corsair" seaplane on May 21, 1927, when an average speed of 130.93 miles per hour for 1000 kilometers was made over the same closed course! Lieut. Rutledge Irvine, U.S.N., Pilot.



The "Corsair" is designed around the P & W. "Wasp" Engine.

CHANCE VOUGHT CORPORATION
LONG ISLAND CITY, NEW YORK

Lindbergh has been called "Lucky" but he took only the necessary risks. He used every safeguard, not only to protect his life and plane, but to assure the success of his undertaking



"Spirit of St. Louis," sturdy monoplane, which carried Capt. Lindbergh through fog, rain and sleet to his goal.

Map showing route taken by Capt. Chas. A. Lindbergh on his flight from New York to Paris.

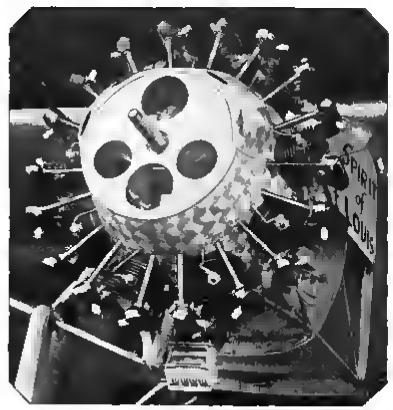
For his epoch making flight, AC Spark Plugs were the deliberate choice of Capt. Charles A. Lindbergh.

AC Spark Plugs were also used in the Bellanca plane piloted by Bert Acosta and Clarence D. Chamberlin, which established a new world's record for continuous flying of 51 hours, 11 minutes and 25 seconds.

Both of these flights were made with Wright *"Whirlwind"* engines.

From the work done to meet the requirements of aviation, has come the development of such highly efficient units as AC Spark Plugs. The net result is the attainment of higher and still higher quality, from which the public gets a real and lasting benefit.

AC's are all made with the same insulation, the same quality of electrodes and embody the same basic design as used by Capt. Lindbergh and other record breaking aviators, racing drivers and speed boat pilots.



Photograph © 1927, P & A Photos

The Wright "Whirlwind" engine in Capt. Lindbergh's plane, "Spirit of St. Louis," showing AC Spark Plugs used on epoch making flight.

AC Spark Plug Company, FLINT, Michigan

AC-SPHINX *Makers of AC Spark Plugs* AC-TITAN
Birmingham *AC Speedometers—AC Air Cleaners* Levallois Perret
ENGLAND *AC Oil Filters—AC Gasoline Strainers* FRANCE

Over 200 of the world's most successful manufacturers use one or more, or all of these AC Products
AC SPARK PLUGS AC SPEEDOMETERS AC AIR CLEANERS AC OIL FILTERS

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Business and Editorial Offices—250 W. 57TH ST., NEW YORK

Cable Address—AEROENG

Publication Office—HIGHLAND, N. Y.

EARL D. OSBORN, *President and Editor*

GEORGE NEWBOLD, *Business Manager*

LESTER D. GARDNER, *Publisher*

L. D. WEBSTER, *Treasurer*

Vol. XXII JUNE 20, 1927 No. 25

Index to Contents

Subscription price: Four dollars per year. Canada, five dollars. Foreign, six dollars. Single current copies, fifteen cents. Back numbers 25 cents. Advertising rates on application.

Issued every Monday. Forms close ten days previously. Entered as second-class matter Nov. 22, 1920, at the Post Office at Highland, N. Y., under act of March 3, 1879.

With the Editor

There is not the slightest doubt that Colonel Lindbergh's New York to Paris flight was the greatest stimulus that aviation has received since the War, particularly from the standpoint of creating the interest of the heretofore more or less disinterested man in the street. But at the same time, as Colonel Lindbergh admits, he only blazed the trail, showed the world that it could be done, and that much hard work and experimentation must be done before a regular trans-Atlantic air service will be an actuality. It does not seem wise that we should concentrate all of our efforts on setting up non-stop long distance flight records, but rather that we should devote a considerable portion to improving on what we have now.

Colonel Lindbergh and Clarence Chamberlin have proved that Europe is within the range of a single engined plane. Such being the case, it would seem altogether feasible to increase the factor of safety by making the flight in three stages. First, New York to Newfoundland, then across to Ireland or England, and from there to the particular destination on the Continent. With two stops en route less fuel would be needed as at each of the landing places sufficient fuel to reach the next stop could be taken aboard and thus allow for more weight in express, mail or passengers. And incidentally some such similar arrangement as that would break up the monotony of a long distance flight.

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Aristocracy of Achievement

THERE IS aristocracy of achievement just as there is aristocracy of man. Some deeds are marked by an inherent nobility that lifts them above other feats, just as the stamp of nobility of character is set upon some men to distinguish them from their fellows.

Aristocracy of man is largely a matter of birth and environment. Aristocracy of achievement is a world peerage of outstanding things performed to light the way for the advance of humanity. In the category of deeds that spur on the world are the feats of vision and daring of the Wrights, the Lindberghs, the Byrds, the Chamberlins, in fact the whole courageous brood that has piloted man's new found means of mechanical locomotion across the ocean to Paris, to Berlin and elsewhere, over the ice barrier to the Pole, around the world itself, all messengers of good will and inspirers of human progress.

In all ages, great deeds have been marked by royal favor, usually in the form of the honor of knighthood. The world has not changed. Kings still award decorations and create knights, while democracies, distinguishing with nice judgment between feats of merely "derring do" and those that rise to super-proportions, grant triumphs that equal in fervor those of ancient Roman, and confer upon the heroic doers, with a nation's accolade, fellowship in the aristocracy of achievement.

The spontaneous triumph that has been accorded Col. Lindbergh is still a glowing spectacle, sweeping westward and leaving in its wake a more intimate knowledge and a truer appraisement of the airplane than the nation had ever known. One of the many things connected with aviation to which the Lindbergh achievement directs attention is that interesting and invaluable institution, the American flying school.

"I took my first flight at Lincoln, Neb., on April 9, 1922" he writes in the *New York Times*. "In the early part of that month I decided to take up flying, so I went to Lincoln and began a course. I was the only student at the time".

This has a familiar ring in American aviation, "at Lincoln, Neb.," and "I was the only student." It just as well might have been said of "over at Kokomo", "down in Memphis", "up at Duluth" or "out in San Diego", for throughout the whole land, in practically every state of the Union, are located these flying schools, starting as did Lindbergh's alma mater at Lincoln, with but a single student, patiently, steadily building up reputation and attendance.

This is one of the characteristics of aviation in the United States, these private flying schools pioneering and keeping alive the spirit of flying in one or more communities in each of the forty-eight states. To these recruiting stations of our aerial activity there drifts, singly, in pairs, sometimes in small groups, the flower of American youth with the unconquerable spirit of the pioneer in its heart, and a few months of wages saved up for tuition and expenses in its pockets.

There are more than 200 such flying schools in the United States, each year they turn out between one and two thousand flying novitiates. Some of these fail and disappear from the field altogether. Some qualify only for the side lines to boost and build up aviation in its various branches. Many become successful pilots and carry on with credit to their profession, and some work their way to the very fore front of aviation, riding, as a routine detail of their work the night and the storm in moving the mail, transporting passengers and freight, or carrying the glory of mechanical flight across oceans and continents like the splendid Lindbergh, who in 1922 was the only student in a typical American flying school out on the prairies of Nebraska.

One of the first and wholly unlooked for fruits of the Lindbergh achievement was the resurgence of the old time affection of the French people for the United States. This phase of the brilliant adventure of Lindbergh in Paris and the official and popular reception of Chamberlin and Levine in Berlin, has been widely commented upon as marking the airplane as a prime medium of good will embassies.

Leaving the United States as private citizens, these three aviators landed on European soil world characters, the inspirers of public enthusiasm for their adventures intense and comprehensive enough to include the whole American people. Irritating questions of state were swallowed up and forgotten in the acclaim of the brilliant performance of the aerial tourists.

There is something leveling as well as elevating, about aerial adventure. The substitution of the pilots helmet for the diplomat's high hat, the leather jacket for the frock coat, and the greasy mitten for the kid glove, appears to breed a mass comraderie that tramples down political barriers and official punctilios between nations.

It has been suggested that nations might take a leaf out of the book of Lindbergh, Chamberlain and Levine, and try the experiment of sending their ambassadors, bound on good will missions, in the cockpits of airplanes instead of on battleships under the frowning muzzles of 16 inch guns. On their arrival they may be mobbed in affection instead of smothered in ceremony, but at least, they would be blazing a trail straight to the hearts of the people, which, after all, is half the battle in diplomacy.

New York's maritime greeting to Colonel Lindbergh.

America Welcomes Colonel Lindbergh

President Coolidge Extends Official Greeting of the Nation and Washington And New York Hold Triumphal Pageants in Honor of the Trans-Atlantic Airman

AT NOON on Saturday, June 11, twenty-two days, five hours and some odd minutes after he had pointed the nose of the "Spirit of St. Louis" through the gray dawn towards Paris, Col Charles A. Lindbergh returned to his native shores to receive a nation's welcome unsurpassed in the history of mankind.

As the cruiser Memphis with its honored guest steamed slowly up the Potomac River to the Washington Navy Yard, squadrons of airplanes circled high over head, batteries of guns boomed their salutes and thousands of people lined along the banks shouted themselves hoarse in tribute to the home coming hero of the air.

Mother First to Greet Him

The first to greet him was his mother, Mrs. Evangeline Lindbergh. What they said to each other is known only to themselves, for the meeting took place in the seclusion of of the captain's cabin on the Memphis completely removed from the eyes and ears of the cheering world outside, but it seems altogether fitting that it should have been just like that.

A few minutes later, Secretary Wilbur and Secretary Davis went aboard, and as the guns of the cruiser barked in sharp salute, Lindbergh came forward, somewhat bashfully to meet them. He bowed gracefully as he took their hands and acknowledged their greetings and compliments.

The bearing of the young flier amazed all who saw him. No diplomat, skilled in the art of appearances or grown old in the service of courtesy, could have been more at ease than he. He was sure of himself and unafraid, yet modest.

In due course the triumphal parade was started along Pennsylvania Avenue towards the Washington Monument. President Coolidge was waiting to extend the official welcome of the country. Both sides of the avenue were jammed with men and women and small children, each striving to make his or her particular cheer of greeting reach the ears of the hero of the hour as he rode slowly through the streets at the side of his mother in the reception car. Hats were thrown in the air and paper fluttered down from the windows of the buildings that lined his route. Before his car were cavalry men, their horses' feet clattering upon the pavement, and behind were detachments from almost every branch of the Army and Navy service. It all was a guard of honor to the gallant flier who but a short time ago was practically unknown to the governmental celebrities in Washington. A colorful and yet dignified gesture of esteem for one who had done so much for the prestige of his country.

Welcomed by President Coolidge

When the parade reached the Washington Monument Colonel Lindbergh mounted the stairs of the President's stand behind Vice Admiral Burrage, and for a moment he almost seemed to hesitate as his eyes swept out over the great sea of people. He had become used to crowds abroad, but these were his own people, this was almost his home town where he had lived ten years. It seemed to hit him as a blow and for the first time Colonel Lindbergh apparently realized what a symbol he had become to all America.

For it was not only the splendor of his flight which had inspired these people. Many of them probably never thought of it. It was the man they had come to see. To them he was a symbol of idealism, of clean courage. In a world grown weary of strife and bickering and corruption he stood out as the epitome of magnificent youth.

The President then stepped forward and grasped Colonel Lindbergh by the hand and there was cordiality and a warm admiration in the Chief Executive's handshake and in his face. Mrs. Lindbergh was just behind her son, and she was greeted by Mrs. Coolidge and took a seat beside her. Lindbergh, after bowing his acknowledgement of the President's greeting, sat beside Secretary Wilbur, where all could see him.

Delivers Europe's Message

In his speech the President conferred high praise upon the trans-Atlantic hero not only for his great achievement but of the admirable way he had conducted himself since landing at Le Bourget Field, referring to him as an "ambassador without portfolio" and a "messenger of peace and good will."

The President then conferred on Lindbergh the Distinguished Flying Cross and gave to him his commission as a Colonel in the Officers' Reserve Corps. The flier's tall form seemed to tower over Mr. Coolidge. He stood straight as an arrow while the cross was being pinned to his coat and then shook hands with the President, who smiled warmly at him as if it was a duty and a privilege which gave him the highest pleasure.

Then stepping forward to the row of microphones while a hush settled over the vast crowds of people Colonel Lindbergh delivered the message of good-will that he had brought back from Europe. He said not a word about himself or of his history making flight, just a short simple message of peace and friendliness, that went straight to the hearts of all who heard him.

(P. & A. Photos)
President Coolidge, Mrs. Coolidge, Mrs. Lindbergh and Colonel Lindbergh.

(Acme)
Cruiser Memphis steaming up the Potomac as seen from the U. S. Naval Dirigible Los Angeles

A few moments later Colonel Lindbergh was whisked away and lost to the crowd, to be driven in the President's car to the temporary White House in Du Pont Circle.

There he was forced to go to the door or balcony several times by cheering people who demanded a view of him. Their enthusiasm was even greater than before he made his brief and amazing speech. That night he slept in the home of the President of the United States, the honored guest of a nation.

The next day was occupied with, an inspection of his plane "Spirit of St. Louis" a visit to the Walter Reed Hospital where he talked with some of America's heroes of the World War, attending church services with his mother and the President, an inspection of Bolling Field, and attending vesper services commemorating the adoption of the American flag where he received at the hands of Charles Evans Hughes the Cross of Honor of the United States Flag Association.

Flies to New York in Army Plane

On the morning of the next day he flew to New York with an escort of twenty-three planes, where he received the greatest ovation of all. He did not pilot the Spirit of St. Louis as was planned due to engine trouble, and instead flashed through the skies at the controls of an Army pursuit plane.

Arriving over New York City he headed straight for Mitchel Field where he brought the plane to earth, jumped out and was dashed across the field in a car to a waiting amphibian piloted by Captain Ira Eaker. Four minutes later

(*Cont. on page* 1380)

How the New York to Paris Plane Was Built

Plans Were Drawn and Plane Built and Ready for Test Flight in Less Than the Contract Time of Sixty Days

By RUSSELL H. MILES

CAPTAIN CHARLES LINDBERGH may or may not be a "flying fool," depending upon whether you view his trans-Atlantic hop as a carefully planned flight, or a mere piece of dare-devilry, but there are no two ways about the fact that there are some flying workers at the Ryan Airlines factory in San Diego. Charley Lindbergh was not the only man in the picture to go thirty-six hours without sleep.

Paris looked a long way off to the flier until he began to talk to B. F. Mahoney, manager of the Ryan company, and saw just how the plane builders worked. The plans were drawn, the machine was built, and was ready to fly in 11 min. less than sixty days, the agreed, contract time in which the monoplane was to be constructed.

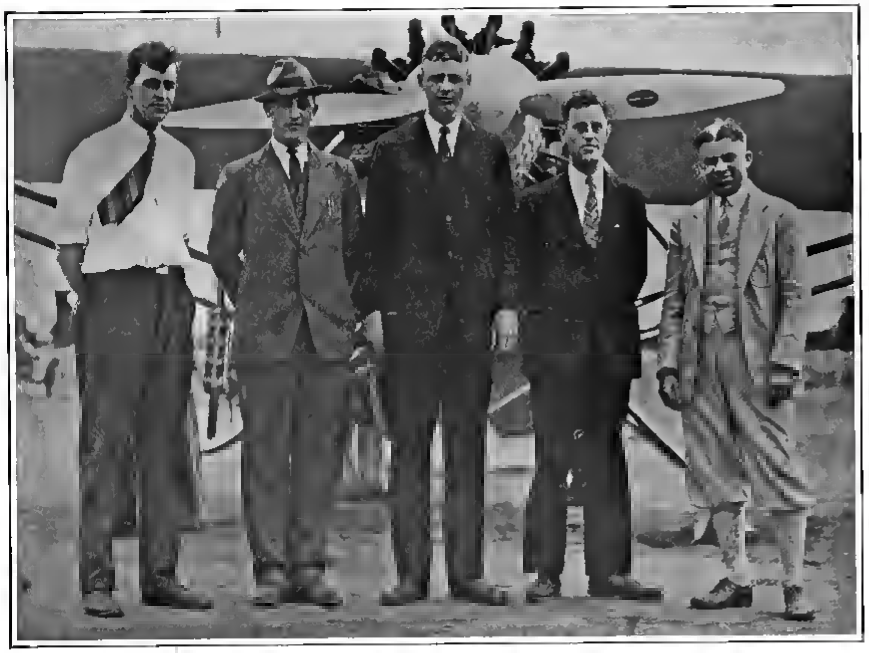
About February 1st, A. J. Edwards, sales manager for the company, received word of Lindbergh's modest demand for a plane that would cross the Atlantic. He was told that Lindbergh wanted a machine to get off the ground with 425 gal. of gasoline, cost no more than $6,000 without engine, and carry the flying postman and his ham sandwiches to Paris—all to be delivered in sixty short days.

The Ryan people told Lindbergh that they would do the job, and on Feb. 28, after a few days of conferences, the contract was signed, at 2:20 P.M. in San Diego, to build the NYP.

"Don't forget, fellows", Lindbergh told the engineers of the plant that afternoon. "I've got to have this plane in sixty days to pay my respects to France."

Charley was not joking, but he did give the impression that if he had the plane in sixty-one days he would not be disappointed. But to the bunch at the Ryan plant, Charley's word was law, and the chief engineer, Donald A. Hall, and factory superintendent, W. H. Bolus, went to work on the job that night and for two months the factory concentrated on the manufacture of the plane. Production of other planes was not stopped, but the NYP had the right of way, night and day.

In order that Charley would not break into the engineers' conference and start to draw the plans himself, Mahoney took the youthful aviator out for a cruise on his yacht that first afternoon after signing the contract. But Lindbergh spent most of his time in the factory, following every detail of construction when he wasn't in the drafting room studying



Left to right—Howley Bowels manager of Ryan Airlines, B. F. Mahoney president, Col. Chas. A. Lindbergh, Donald Hall, aircraft engineer and designer of Lindbergh's plane and Adolphe Edwards, sales manager.

navigation, or taking long walks along the beach, training for the thirty-six hours of sleepless grind across the Atlantic.

W. H. Bowlus, builder of the Ryan M-2 from which Don Hall drew the specifications for the NYP, knows his stuff and reveals in it. Hall, designer of the NYP, was formerly an airplane engineer with the Douglas Aircraft factory and is twenty-eight years old, while Bowlus is thirty-one. Hall worked as long as thirty-six hours at a stretch, drafting plans for the plane.

Never Saw Ryan Plane

Although Lindbergh had never seen a Ryan plane, the reputation gained by the silver monoplane in the Denver mile high meet and the Ford reliability tour last year, had convinced him of the quality of the San Diego product, and he declared after seeing the Ryan factory in operation that it was the only plant in the United States which could produce the type of plane he wanted and produce it when he wanted it.

When the plane was finally finished, Lindbergh was the first to try it out. In fact, he is the only one that has ever held the stick of the first plane to span the 3600 miles between New York and Paris. Charley quietly stepped into the plane, flew over the field and down again, and remarked, "It's a good ship." From the laconic Lindbergh, it was eloquent.

In commenting on Lindbergh the day he left San Diego for St. Louis, Mahoney remarked: "That boy combines the finest and most essential qualities of a model aviator. He is a good navigator, and has studied weather conditions until he is an expert meteorologist. He knows what he can do in a plane and then does it perfectly. He is not reckless, not a 'flying fool', but rather a sure-fire, pilot. If anyone can make the hop to Paris, Lindbergh can."

Lifted Three Times Own Weight

The "Spirit of St. Louis" at the take off of the trans-Atlantic hop lifted over three times its own weight or 3.13 times its empty weight, to be exact. The empty weight of the plane without special equipment was 1695 lb., and gross weight, 5300 lb. Empty, but complete with instruments and special tanks, the plane weighed 2150 lb.; its useful load with 450 gal. of gasoline, pilot, etc., was 3605 lb. or 2.12 times the net, empty weight.

A total of 3000 man hours were put in on the construction of the plane, 860 of which were devoted by the engineer, and 775, or an average of 13 hr. a day, by Don Hall himself as designer.

It was a good pilot, a clever navigator, and a reliable plane that conquered the Atlantic for America.

Delegates Complete Tour

Five Latin-American delegates to the Inter-American Commercial Aviation Conference have just completed an air tour covering the industrial center of the United States. The trip was arranged by William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, with the cooperation of the Aviation Section of the Ford Motor Company, which supplied the Stout all-metal three-engine plane in which the flight was made.

The purpose of the trip was to enable the delegates from Latin-America to make personal visits to the leading American aircraft manufacturing companies and to familiarize themselves with the development of the aircraft industry in the United States.

The personnel of the flight included Major Angel Maria Zuloaga, Military Attache of the Argentine Government, Comdr. Francisco Lajons, Argentine Naval Attache, Lieut. Colonel Carlos Garfias, Military Attache of the Chilean Government, Senor Juan Guillermo Villasana, and Senor Jose Vasquez Santaelle, delegates from Mexico to the Aviation Conference. These official representatives were accompanied by J. D. Summers, of the Aeronautic Branch, Department of Commerce. The plane flew from Washington to Philadelphia and then to the following cities: New York, Albany, Syracuse, Rochester, Buffalo, Detroit, Cleveland, Columbus, Dayton, and then back to Washington.

Flights were made on only five days. There were no difficulties in making the trip and the delegates expressed themselves at the ease with which the schedules were maintained between cities. They were also gratified at the comfort of riding in the all-metal cabin plane which is supplied with easy chairs and apparatus for heating and ventilation.

The flight was begun on May 26 and ended in Washington on June 4.

Medals Awarded to Colonel Lindbergh

The coveted Hubbard Gold Medal of the National Geographic Society awarded to Col. Charles A. Lindbergh. Only seven other famed explorers have ever been awarded the medal, among them being Admiral Peary and Commander Richard E. Byrd.

The Langley Medal for Aviation presented to Charles A. Lindbergh. Only four others have received the honor. Orville and Wilbur Wright, Glenn H. Curtiss, and Gustave Eiffel.

Venezuela Decorates Pan-American Fliers

The Minister of Venezuela recently presented to the Secretary of State in the presence of the Secretary of War, the insignia of the Order of the Liberator, which has been conferred by the Venezuelan Government on the Pan-American fliers, Major Herbert A. Dargue, Capt. Ira Clarence Eaker, Capt. Arthur Bee McDaniel, Lieut. Tonientes Muir Stephen Fairchild, Lieut. Leonard Dickson Weddington, Lieut. Ennis C. Whitehead, Lieut. Charles McKinley Robinson and Lieut. Bernard Scott Thomson.

The Minister in presenting the decoration said that the Government of Venezuela welcomed this opportunity not only to bestow this well merited honor on the aviators but also to express its deep appreciation and friendship for the United States. As all the recipients are officers in the Regular Army they will be unable to accept this decoration unless an act of Congress is passed authorizing them to do so. Until such time as an act may be passed the decoration will be retained in the Department of State.

United States to E urope and Return

A Land, Sea and Air Log of Colonel Chas. A. Lindbergh's Great Adventure

Friday May 20

TAKES OFF from Roosevelt Field, L I. in Ryan monoplane (Wright Whirlwind) "The Spirit of St. Louis" at 7 52 A M , New York time, on the first leg of his history making non stop flight to Paris Passes over St. Johns, N. F and heads ont to set at abont 7·15 P.M , New York time.

Saturday May 21

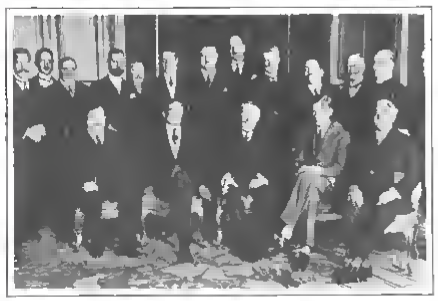
After flying alona for 3,610 mi over land and sea, 1,000 mi. of which were through rain, sleet and fog, he lands at

On the way to France

Le Bourget Field ontside of Paris, France, at 5 21 P M., New York time. Total time of the flight 33 hrs 29 mnn 30 sec. Over 100,000 people swarm over the field when he lands and it is two hours before he can reach the American Embassy where he becomes the guest of Ambassador Herrick

Sunday May 22

Arises refreshed from ten hours sleep and appears on balcony of the Embassy and acknowledges the cheers of anthusiastic thousands who are waiting ontside. Talks with his mother by radio-telephone and pays a visit to the mother of Captain Nungesser, whose fate as a result of an unsuccessful flight from Paris to New York is still unknown.



Left to right, Paul Painleve minister of war, Ambassador Herrick, Aristede Briand prime minister, Colonel Lindbergh and W Sarrant, minister of interior.

Monday May 23

Goes out to Le Bourget Field to inspect his machine and finds thet the souvenir hunters have inflicted comparatively little damage. Is received in the Elysee Palace by Gaston Doumergue, President of France and is decorated with the Cross of the Legion of Honor Visits the Aero Club of France and receives the Club's gold medal and the plaudits of leading French airmen Is presented to Premier Poincare at the Ministry of Finance.

Tuesday May 24

Receives cabled invitation from President Coolidge through Secretary of Navy Wilbur to return to the United States aboard ona of the vessels of Destroyer Division 25 or tha cruiser Memphis. Attends all-American luncheon held in the

Colonel Lindbergh with President Doumergue and Ambassador Herrick

Hotel Ambassadours Receives hundreds of congratulatory messages from governmental heads throughout the world

Wednesday May 25

Goes out to Le Bourget Field and prepares his machine for a flight to Brussels, Belgium. Meets Louis Blerlot, tha first man to fly across the English Channel in 1909, and attends reception given him by the Chamber of Deputies. Is introdneed by President Bouisson and speaks about his trans-Atlantia flight.

En route from Paris to Brussels

Thursday May 26

Visits Marshal Foch, former Commander-in-Chief of the Allied Armies, goes to the Invalides and pays respects to disabled French and Belgium veterans of the world war. Attends official reception at the Hotel de Ville and receives the Gold Medal of Paris Visits Marshal Joffre, father of the French army and hero of the Marne, and luncheons with Foreign Minister Briand and other diplomatic celebrities at tha Quai d'Orsay.

Friday May 27

Gets up at 5 o'clock and goes out to Le Bourget Field Takes up a French Nieuport plane and gives the French an exhibition of his flying ability Makes an inspection of the "Spirit of St Louis" and visits the large military aviation field at Ville Coublay Has luncheon with Paul Painleve, French Minister of War, Marshal Foch, General Pershing, and several other ministers Goes to the Luxembourg Palace and is received by the French Senate Attends garden party at the Ministry of Commerce and a reception at the Airmen's Club in the Bois de Boulogne

Saturday May 28

Takes the "Spirit of St. Louis" into the air, circles about Paris, drops message, and then heads for Evre Field, outside of Brussels, Belgium Is presented to King Albert and Queen Elizabeth of Belgium and decorated with the order of Chevalier of the Royal Order of Leopold Places wreath an tha tomb of the Unknown Soldier Receives Belgian Aero Club's Gold Medal and the Gold Medal of Brussels.

Sunday May 29

Flies the "Spirit of St Louis" from Brussels to London and is welcomed by frantic thousands at the Croyden Airdrome Experiences considerable difficulty in evading the crowd and is eventually received by the political and aeronautical heads of England

Monday May 30

Is guest of honor at a private luncheon given at the American Embassy by Ambassador Hoeghton Attends Memorial Day services at St. Margaret's church, Westminster Lays a wreath on the Tomb of the Unknown Soldier Is guest of honor at an informal dinner given by American newspapar men in London.

Tuesday May 31

Flies the "Spirit of St. Louis" to Gosport for dismantling and shipment to the United States Presented to King George and Queen Mary at Buckingham Palace and decorated with

Boarding the Cruiser Memphis at Cherbourg

the British Air Force Cross Receives invitation from President Coolidge to return direct to Washington, D C aboard the cruiser Memphis. Calls on the Prince of Wales and Premier Baldwin Visits the House of Commons, is goest of honor at the Royal Aero Club dinner, and attends Derby eve ball at Albert Hall.

Wednesday June 1

Accepts President Coolidge's invitation to return with plane direct to Washington on the cruiser Memphis. Is guest of Lord Lonsdale at the running of the English Derby. Is given a banquet by the American Society, the American Chamber of Commerce, and the American Club of London.

Thursday June 2

Motors to Kenley Airdrome near London with intentions of flying across the Channel to Paris in a plane placed at his disposal by the Royal Air Force. Finds fog conditions too bad and postpones flight Spends night at Kenley as goest of Royal Air Force. Is presented by the American Informa-

(Cont on page 1398)

With the Prince of Wales at the Derby Ball

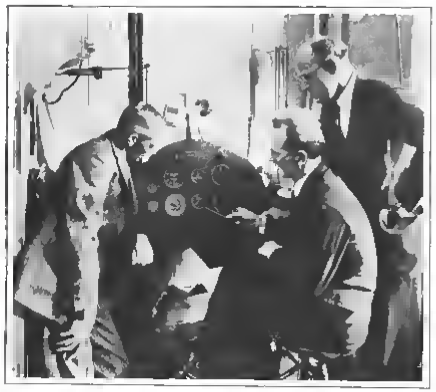
The Pioneer Earth Inductor Compass

Its Characteristics, Construction, Operation and Advantages to the Aerial Navigator

By MAURICE M. TITTERINGTON*

THE SUCCESSFUL flight of Charles A. Lindbergh from New York to Paris until the accuracy of his navigation has caused considerable interest in the instruments used by him. Although several instruments such as the turn and bank indicator and air speed indicator were essential to him when flying through fog and darkness, this article will be restricted to the Pioneer Earth Inductor Compass. To this compass Lindbergh attributed the successful navigation of his airplane across the ocean and to Paris.

In order that the advantages of the Pioneer Earth Inductor Compass may be appreciated, it is necessary to consider the characteristics of the ordinary magnetic compass used on aircraft. The force which causes the magnetic compass to point out directions is the reaction between the compass magnets



J. H. Steuer, Air Corps; E. H. Goldsborough, Pioneer Instrument Co. and Maurice Titterington, chief engineer of the Pioneer Instrument Co.

and the earth's magnetic field. As long as the magnetic element, that is the compass card with its magnets and pivot, is constrained to rotate in a horizontal plane the magnets tend to line up with the horizontal force of the earth's magnetism and the compass points out directions in relation to magnetic north. Unfortunately, the direction of the earth's magnetism is not horizontal except at a few places on the earth. In the vicinity of New York, it is inclined downward at an angle of about 70 deg. to the horizontal. Considering the magnetic force to be separated into horizontal and vertical components we find that the vertical component is about three times as strong as the horizontal component. When the compass is mounted on a fixed support where the magnetic element is held horizontal by the force of gravity, its magnets react with the horizontal component of the earth's magnetism. Under these conditions the compass is very accurate. However, on aircraft the conditions are much different. The fore-and-aft accelerations forces and the centrifugal forces act on the pendulous magnetic element to tilt it out of the horizontal and cause it to act as if constrained to rotate about some axis inclined to the vertical. When so inclined the vertical component of the earth's magnetism acts on the compass-magnets so as to cause the compass element to rotate. This may result in errors of as much as 180 deg.

The second source of error is the angular movement of the aircraft in yawing, rolling and pitching. These movements are transmitted to the magnetic element through the liquid. While the liquid tends to reduce the first type of error, it is responsible for the errors of the second type.

Error Caused by Vibration

A third variety of error is caused by the vibration of the aircraft. These vibrations usually have rotary components in the plane of the magnetic element which act on it through the liquid and the pivot point causing erratic indications.

A fourth type of error is caused by magnetic materials in the vicinity of the compass. The engine with its ignition system and the movable parts of the control system are particularly bad in this respect. The movable parts of the control system produce errors of varying magnitude which are nearly impossible to overcome. Structural parts of the aircraft, if of ferrous material and not magnetized, produce errors due to induction from the compass needles. All of these magnetic errors can be reduced to some extent by compensation but in most cases the results are uncertain and require frequent checking.

It will be seen from the above that the ordinary magnetic compass has certain inherent defects which often cause it to be inaccurate and unreliable in its operation. The necessity that it be placed close to the pilot establishes it in a location where it is subjected to the worst possible magnetic conditions.

In the Pioneer Earth Inductor Compass the defects of the ordinary magnetic compass are obviated or greatly reduced. The outstanding feature of the Pioneer Earth Inductor Compass is the separation of the magnetic element from the direction indicating element.

The Generator is the direction determining element of the compass and corresponds to the magnetic needles of the ordinary compass. It is similar to any direct current electric dynamo, having an armature with commutator and collector brushes, but with no artificial field, the earth serving as a field. Fig. (1) shows a plan view of an armature rotating on a vertical axis in the earth's magnetic field. The direction of the earth's field is shown by the dotted lines. A pair of brushes are connected to an electric galvanometer of the zero center type and bear on diametrically opposite sides of the commutator. Such an armature rotating in a magnetic field produces electrical potential at the commutator. If the brushes are rotated around the commutator, it will be found that the indication of the meter will vary from zero to maximum in one direction, back to zero, then to maximum in the other direction and to zero again when the brushes are returned to the first position.

Galvanometer Indicates Brush Alinement

There are, therefore, two diametrically opposite points on the commutator where the meter shows zero potential and two similar points 90 deg. around from "zero" where the meter shows maximum potential.

The angular relation between a line drawn between the points of zero potential on the commutator and the direction of the earth's magnetism is always the same. If the armature is wound and connected to the commutator so that the points of zero potential are in line with the magnetism of the earth, the galvanometer will show zero only when the brushes are in line with the direction of the earth's magnetism. Therefore, when the galvanometer shows no indication, we know that the brushes are in a line with magnetic north south.

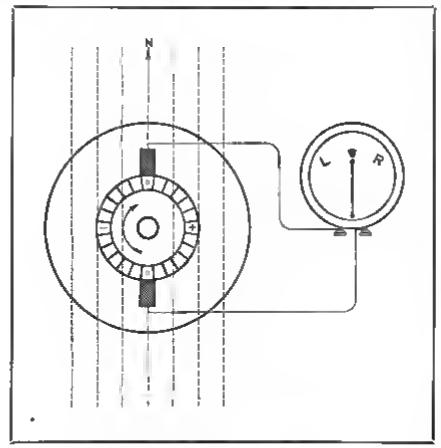


Fig. 1

We will consider the operation of a compass as shown diagrammatically in Fig. (1) when mounted on an airplane. We will first swing the airplane on the ground until it is pointed in some known direction, say north. With the armature running we will rotate the brushes until the galvanometer shows that no current is flowing. If the airplane is flown directly north, the galvanometer will continue to show zero, as the brushes are in contact with the points of zero potential on the commutator.

Brushes Connected to the Meter

Should the airplane be turned slightly towards the east, the brushes will be rotated with the airplane around the commutator towards the points of maximum potential and electric current will flow from the armature to the meter causing the meter pointer to move to one side of zero. The brushes are connected to the meter so that the meter pointer will move in the direction in which the airplane is turned, and by steering so as to keep the pointer on zero, the north course would be followed. In case it is desired to follow another course, the angle of the brushes in relation to the airplane is changed by the amount the angle of the desired heading differs from the zero or north heading. For example, if it is desired to fly East or 90 deg. from North, the brushes would be rotated by hand through an angle of 90 deg. so that the brush that was on the north side of the commutator is now on the west side and the brush that was on the south side is now on the east side. Current will now flow through the meter in such a direction that the meter would show "left" that is, the meter would show that the airplane was to the "left" of the desired heading. The pilot would turn towards the right, and when he had turned 90 deg. the brushes would be returned to the north south position and the meter would again show zero and the pilot would know that he was flying east.

Similarly any other course can be flown by adjusting the brushes to the correct angle and steering so that the meter hand stays on zero.

The usual method of steering by this compass is to set the desired heading on the controller and then to steer to keep the meter on zero indication. A direction exactly opposite to that desired will also give the zero meter reading, but this is easily avoided by noting that the meter hand always moves in the direction in which the craft turns. Should it move opposite the reverse heading is indicated.

The Pioneer Earth Inductor compass consists of three principal units, a generator, a controller and an indicator. The generator contains the armature which is suspended in gimbal rings and driven by an anemometer or windmill. The generator brushes are mounted so that they may be rotated around the commutator. The stability of the armature is maintained by the action of its own gyroscopic force and the use of a suitable damping device.

Controller a Mechanical Device

The indicator is a sensitive zero center galvanometer. It is electrically connected to the brushes of the generator.

The controller is a purely mechanical device for setting the angle of the generator brushes to correspond to the desired heading. It is connected to the generator by a flexible shaft run through a flexible casing.

Dials on the face of the controller show the angle through which the brushes have been orientated in relation to the airplane.

The generator is usually mounted in the rear of the fuselage with the anemometer projecting above the fuselage into the air stream. This position is usually good as regards magnetic conditions, but it may be mounted at any place on the airplane, even in the wing.

The meter and controller are usually mounted on the instrument board in front of the pilot. However, on some large airplanes the controller and a duplicate meter have been

placed at the navigator's position, where the navigator can "set" or change the course, the pilot merely steering to keep his indicator pointer on zero.

Recalling the four types of errors common to magnetic compasses, it is pertinent to point out that in the Earth In-

(Cont. on page 1400)

*Chief Engineer of the Pioneer Instrument Co. of Brooklyn, N. Y.

Lindbergh's Wright Whirlwind a Result Of Seven Years' Development

Work Began on Feb. 28, 1920, and Since That Time Seven Successive Models of Air-Cooled Radial Engines Have been Produced

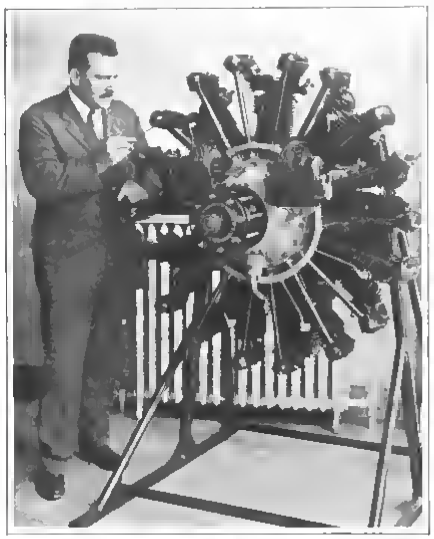
THE VALUE of the four characteristics which make the Wright "Whirlwind" engine a most important factor in the advancement of commercial aviation was clearly demonstrated by Colonel Lindbergh's non-stop New York to Paris flight. Safety, durability, economy and high performance of his engine were most essential to the success of Lindbergh's great accomplishment, and in all four the "Whirlwind" lived up to its reputation.

The items of safety and durability were proven by the fact that Colonel Lindbergh arrived at Le Bourget, and by his own statement that his "Whirlwind" functioned perfectly for the entire trip which included over 1000 mi. of rain, sleet and fog.

The economy of Lindbergh's "Whirlwind" is shown by the fact that the average fuel consumption was less than 12 gal. per hour, or over nine miles per gal. In view of the fact that the initial load was over 24 lb. per hp., that may be considered a remarkable fuel economy.

A conclusive illustration of the high performance of the "Whirlwind" in the Ryan plane is found in the average cruising speed at part throttle, which was over 109 m.p.h. with exceptionally heavy loads from San Diego to New York and from New York to Paris.

The Wright "Whirlwind" J5C used by Colonel Lindbergh is the result of seven years of intensive development on one type of engine without changing any basic feature of the design. The development was commenced on Feb. 28, 1920, and since that time seven successive models of air-cooled engines have been developed and over 1000 engines sold, most of which were put into immediate service. The practical experience and technical data resulting from the tests of each model formed the groundwork for further improvement in detailed design. The service testing was in the hands of the U. S. Navy and many commercial interests.



Charles L. Lawrance, president Wright Aeronautical Corp., with the "Whirlwind" engine he developed

Experimenting for Many Years

Up to the time of the closing of the World War no American air-cooled engine producing more than 100 hp. had been successfully constructed and it was felt that the expense of developing such a principle, together with the difficulties bound to be met, would not warrant the expending of funds than available. Fortunately, however, a few farsighted men had faith enough in the air cooling principle to devote their time and money to further development of such a type of engine.

As far back as 1916 Mr. Charles L. Lawrance, present president of the Wright Aeronautical Corp., was experimenting with radial air-cooled engines, starting with the two-cylinder opposed model "A" of 28 hp. at 1400 r.p.m., which by gradual changes was developed into the successful type of three cylinder radial engine known as the model "L" of 60 hp. at 1800 r.p.m. These experiments in aviation radial engines were considerably encouraged by both the Army and Navy Air Services by the purchase and trial of these engines on experimental planes. By 1919 both the Army and Navy Air Services had a number of model "L-2" engines in use in planes used for messenger and training purposes.

Being encouraged by this success it was decided to proceed with a more ambitious program and a contract was entered into with the Engineering Division of the Army Air Service for the construction of a nine-cylinder radial engine known as the "R-1". This engine was constructed and subjected to a fifty hour test by the Engineering Division, with highly satisfactory results, the tests being conducted during the month of July, 1921. The engine was a nine-cylinder job, with a bore of 4¼ in. and a stroke of 5¼ in. The total displacement was 670½ cu. in. The engine developed 147 hp. at its rated speed of 1600 r.p.m., and weighed approximately 410 lb. The fuel consumption of the "R-1" on the fifty-hour endurance test averaged .52 lb. per hp. hr., and the oil consumption averaged 12 lb. per hp. hr., which is rather high as compared with the latest "J" type engine, which averages .012 lb. per hp. hr. This represented the first successful endurance test on an American-built radial air-cooled engine of over 100 horsepower and gave a tremendous stimulus to the entire air cooled engine development program.

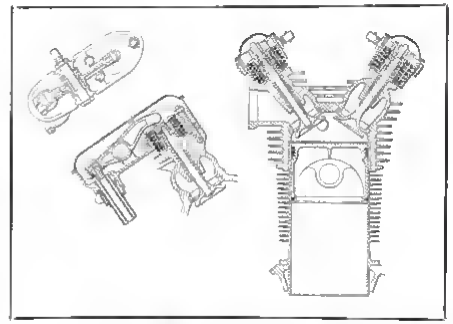
Contract for Nine-Cylinder Engine

Early in 1920 the Army Air Service entered into a contract with the Lawrance Aeronautical Engine Corporation for three model "R-1" engines. Simultaneously with this development, the Navy Department on February 28, 1920, gave the Lawrance Corporation a contract for the construction of five, nine-cylinder radial air-cooled engines to develop 200 hp. at 1800 r.p.m. They were similar to the "R-1" except cylinder and stroke were increased to 4½ in. by 5½ in. These five engines were designated as model "J-1". The first "J-1" engine was delivered in May, 1921, to the Aeronautical Engine Laboratory at Anacostia, D. C., where the engine was subjected to a fifty-hour endurance test. This test was started on December 19, 1921, and completed January 10, 1922. The maximum horsepower developed by this engine was 233 at 1800 r.p.m., the fuel consumption being .53 lb. per hp. hr. and the oil consumption .05 lb. per hp. hr. Even before the completion of the fifty-hour tests on either the "R-1" or "J-1" engine, the development of the radial engine appeared so promising to the Navy Department that on June 30, 1921, they gave the Lawrance Corporation a production contract for fifty model "J-1" engines.

This engine was destined to supersede all other American built engines in its range of power output, and until the end of 1925 represented the only American-built air-cooled radial type to successfully complete a standard fifty-hour endurance test.

Aeronautical Profession Convinced

The development of the "J" series up to this point had served to convince the American aeronautical profession that the air-cooled engine was not only a feasible type, but that it possessed many inherent advantages over the water-cooled engine. There were, however, two respects in which these engines did not compare favorably with the water-cooled variety. It is evident that an open valve gear exposed to moisture, dirt, etc., cannot possibly be as durable as a completely enclosed gear, such as is employed on the water-cooled engines, and the "J-4A's" do not show quite as low a fuel consumption as may be obtained from the best water-cooled engine of the same power output. In an effort to remove these two remaining handicaps, and at the same time still further increase the endurance of the "J" series, the "J-5" model was developed. The engine consists essentially of a "J-4A" crankcase, though not interchangeable, equipped with an entirely new variety of cylinder and valve gear. The cylinder construction consists of a steel barrel with integral fins, provided with a cast aluminum head screwed and shrunk to the upper end of the barrel. The total cooling surface is greatly increased over that provided on the "J-4A", and the port arrangement has been modified to further improve the cooling of the head. This cylinder and cylinder head construction is largely responsible for the improved fuel economy of the Model J-5. Salt-cooled valves are utilized, which result in maintaining the exhaust valve temperature below red heat at all times. The valve gear is entirely enclosed, and all wearing surfaces throughout the gear have been generously increased. The piston design has been modified, and a superior alloy employed with a view to reducing the working temperature and improving the wearing qualities of the piston. The J-5 model has also been provided with a new type of carburetor developed by the Stromberg Company, which incorporates in a single unit three barrels supplied by a common float chamber, each barrel communicating to three cylinders through a separate manifold. This arrangement results in very satisfactory distribution and avoids the complication involved in using three separate single-barrelled carburetors.



Model J-5 cylinder construction with hemispherical combustion chamber and valves set at approximately 72 deg. Valve-seats are of aluminum bronze shrunk into the cast aluminum head. Cylinder-barrel is screwed and shrunk into the aluminum head casting.

It is the policy of the Wright Company to incorporate engine improvements and minor new developments in their engines as rapidly as possible. To designate each factory run of engines exactly the same detailed design, capital letters are added to the basic model designation. In this way the Model J-4A was a refinement of the Model J-4, and in a simi-

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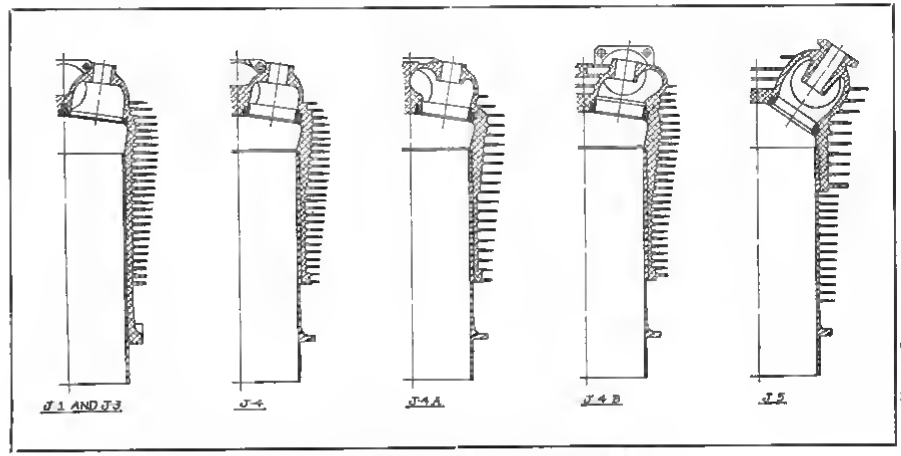


Cylinder Sections of Wright "J" Series Engines, Showing Development of Cylinder Designs.

Bellanca Plane Arrives at German Capital

After New Propeller is Put On Chamberlin Takes Plane Out of Kottbus Swamp and Flies With Welcome Escort to Tempelhof Field

THE COLUMBIA, which was forced to land in a swamp at Kottbus Germany, on June 6 sixty miles from Berlin, the goal of its pilot, Clarence Chamberlin, left that place on June 7, at 4 20 p.m. escorted by fifteen German airplanes. After circling twice over Kottbus as a farewell to the little city, the plane headed for the Tempelhof Flying Field at Berlin, which was reached at 5:51 p.m.

The Lufthansa had generously offersd transportation to the pilot and his passenger Charles A. Levine, but the American felt that if it were possible the trip should be continued in the Columbia. The Lufthansa provided a new propeller, which arrived at Kottbus aboard a special plane from Berlin. Two wheels, larger than those hitherto carried by the American plane, were also supplied in order to make the ascent from the marshy ground easier.

The day of June 8 was crowded with events for the Americans, and the fliers gave a reception to press representatives. At ten in the morning they were the guests of honor at a dinner given by Ambassador Schurman in the American Embassy, where Chancellor Marx, Major von Hindenburg, Papal Nuncio Pacelli and other distinguished guests joined in a rousing tribute. They were later received by President von Hindenburg and entertained at a tea in the palace of Chancellor Marx.

The fliers were officially welcomed by U S. Ambassador Schurman and the German Government Minister of Commerce Curtius. The congratulations of the German nation were tendered by Burgomaster Scholz of Berlin.

The little Prussian city of Kottbus enjoyed a day of excitement while acting as host to its two unexpected guests. From dawn until the departure of the plane, the market place of the town was filled with natives who cheered continuously. The crowd had been augumented by representatives of the press and numerous others from Berlin and, after breakfasting, the Americans were taken to the City Hall, where an offical welcome in the form of a speech by one of the burgomasters was given. The guests were made honorary citizens of Kottbus and escorted back to their hotel.

The crowds who had waited in vain on Monday, June 6, for the appearence of the Bellanca plane over the Tempelhof field, returned to that spot 150,000 strong. The loud siren which announces the arrival and departure of the Lufthansa planes gave three great blasts to signify that the plane had been sighted. In a few minutes the Bellanca plane and its escort soared over the field, to the cries of the crowd, and the waving of American and German flags. The planes then flew over Berlin to give the thousands who were watching in that city an opportunity to see the plane which had made the historic flight. A few minutes before 6 p.m. the air fleet reappeared above the field, made a loop over the airdrome, and then slowly descended. Burgomaster Scholz presented the Americans with a huge floral wreath, and numerous clubs,

A Section of the Tempelhof Air Field at Berlin, Largest and Most Frequented in Europe, Where the Bellanca Monoplane With Chamberlin and Levine in the Cockpit Landed Amid a Crowd of 35,000

including the Federation of Air Service Veterans, also gave wreaths in homage. Two of these were draped on the propeller of the Columbia and the plane was then rushed into a hangar. Chamberlin and Levine were taken in an auto mobile to the American Embassy.

Mauretania Sighted

Commenting upon their flight, the fliers told of sighting an iceberg, the first they had ever seen; and thinking it was a ship. After this experience, the plane ran into a fog, which at one time was so dense that Chamberlin ascended 15,000 ft in the hope of escaping it. This was in vain. This was as high an altitude as the plane could attain with the load it was carrying. From this height, Chamberlin brought the plane down to within a few feet over the water. The temperature then rose to 60 deg, and the pilot began to fear he was going too far south. After midnight he exchanged signals about 600 miles off the coast of Newfoundland with some boat which passed nearby. The identity of this ship was not determined.

The next thrill that the fliers received was the sighting of the Mauretania. The Columbia circled it several times and the fliers were able to read the ship's name clearly. The plane came to within fifty feet of the liner. Two hours after passing the Mauretania, the fliers encountered patches of fog, which became thicker until they closed in on them entirely. Toward evening another ship was sighted, which proved to be the Transylvania. It was shortly after this that land was seen for the first time since the plane had left the North American coast. This sight of England was only a glimpse, however; for a few minutes later the plane was over water again. As the fliers flew over England and to the coast the second night of their flight, the fog reached almost to the ground and they had to buck a northwest wind, which forced them out of their course. They found themselves going through a continuous storm, the wind shifting from the northwest to the south during the night. Plymouth England was the last place seen by the fliers before the fog and darkness closed in on them. They had intended to cross the Channel to Paris and then go northeast again to Berlin. Sixty-five gallons of gasoline remained, and this, they calculated, would be ample to carry them to Berlin.

Climbed Plane to 20,000 ft.

They planned to cruise over France and Germany during the night, merely to kill time, and to await for the first signs of dawn before landing. While trying to go northeast to Berlin, they ran into another high fog and were forced to shift their course again. The plane went to an altitude of 20,000 ft., and the thermometer recorded 18 deg below zero. From an altitude of 20,000 ft., they dropped down until the plane was 300 ft., above the ground. The plane passed just over the tops of factory chimneys and the red glare from great furnaces lit up the fog, but it was impossible for the fliers to determine what city they were passing. In order to find this out, they dropped down and discovered they were over the flying field of Dortmund.

By this time only ten gallons of gasoline were left, but they decided to fly until the supply had been exhausted. This occurred near a village in Eisleben, where a landing was made. Twenty gallons of benzol were procured from a nearby town. Four hours after landing, they resumed their flight.

The villagers had disagreed on the direction to Berlin, and the fliers were unable to come to a decision on it. The supply of benzol was consumed in flying first in one direction and then in another, and they realized they must land again. As the wheels of the plane hit the muddy field, they sank down below the mud and made a rut, which caused the plane to turn over on its nose with the tail in the air. This caused the breaking of one of the propeller tips. A crowd collected, members of which assisted in bringing the tail of the plane down and getting the propeller out of the mud. The fliers found they were outside of the village of Klinge, near Kottbus.

At an imposing ceremony in Berlin the Lord Mayor presented the fliers with the Medal of Honor of the City of Berlin. Thousands waiting outside the city hall cheered their names to the echo and tried every ruse imaginable to get near to the aviators and obtain their autographs.

Both of the trans-Atlantic fliers were much impressed by their visits to German aircraft factories. A fitting tribute was paid to the memory of a famous German Ace. Captain Manfred von Richtofen when the American pair laid a wreath on his grave.

Plans for a flight to Vienna were temporarily postponed when Chamberlin found that the valve mechanism of his engine was jammed. Reception festivities had so taken up the pilot's time that it was not until a short time before he was planning to leave that he was able to make a thorough inspection of the engine. As soon as the repairs have been made the flight will be commenced and in the meantime the fliers are enjoying a much needed rest at Baden-Baden.

Planes of Trans-Atlantic Flights Registered

Clarence Chamberlin and the Bellanca monoplane "Columbia" have been registered with the Department of Commerce under the provisions of the Air Commerce Act of 1926 requiring the examination and registration of all commercial pilots and commercial aircraft operating within the boundaries of the United States.

Application for registration of the Bellanca plane was filed with the Department of Commerce by the Columbia Aircraft Corporation of New York City. The plane was manufactured in September, 1926, according to the statement on file.

After examination by an inspector of the Aeronautics branch of the Department the plane was registered as an aircraft of the United States and assigned the identification mark NX 237 which designates the plane as an experimental aircraft licensed to engage in international flights.

In an application filed with the Department for a license as a commercial air pilot, Chamberlin said that he was born in Denison, Iowa, had engaged in approximately 2500 hours of flying, which flying time has since been supplemented by his record endurance flight and subsequent experimental flying, and that he had built and converted 231 planes since 1919.

The numerals "140" painted on the fuselage of the plane are private markings and bear no relation to the official registration with the Department of Commerce.

Captain Charles A. Lindbergh and the Spirit of St. Louis in which he made the non-stop trans-Atlantic flight are also registered with the Department of Commerce.

Chinese Student at Balloon School

The War Department has approved the application made through the State Department by the Chinese Embassy for Tu Ying, a Chinese student, to receive instruction at the Balloon and Airship School, Scott Field, Belleville, Ill.

Tu Ying is twenty-two years old, having graduated from the Tsang Hua College at Peking in 1925, and from the Honan Military Academy at Kaifong in 1926. He is now attending the Ohio State University at Columbus, Ohio, where he is taking a course in military science.

A Correction

In a page advertisement of the Advance Aircraft Co. of Troy, O., manufacturers of Waco planes, which appeared in the May 30 issue of AVIATION, a printing error made the horsepower range available for Waco planes appear as from 90 to 150 hp. This should have read "from 90 to 250 hp."

BRIGADIER GENERAL JAMES E. FECHET

To Become Chief of Air Corps, Dec. 13, 1927

General Fechet to be Chief of Air Corps

Appointment Effective Upon the Statutory Retirement of Major General Mason M. Patrick on December 13, 1927

THE PRESIDENT has approved the recommendations of the Secretary of War for the appointment of Brigadier General James E Fechet, Assistant to the Chief of Air Corps, to be Chief of Air Corps with the rank of Major General, upon the retirement of Major General Mason M. Patrick, Chief of Air Corps, when he reaches the age of statutory retirement, 64 years, on Dec. 13, 1927.

General Fechet was born in Fort Ringold, Texas, Aug. 21, 1877. He enlisted as a private in the 6th Cavalry, April 18, 1898; and was promoted Corporal and Sergeant and appointed a Second Lieutenant of Cavalry July 25, 1900. He was promoted First Lieutenant, Captain, Major and Lieut Colonel, Regular Army. He participated in the Santiago Campaign, being wounded at San Juan July 2, 1898, and was also in numerous skirmishes on the Island of Samar, Philippine Islands, in June and July 1901. In 1904 he was graduated from the Infantry and Cavalry School, Fort Leavenworth, Kan. He was a distinguished marksman 1909, 1914 and 1915 and served with the Punitive Expedition in Mexico from March to Sept., 1916.

A Qualified Pilot

General Fechet is a qualified pilot, having been on continuous aviation duty since Sept., 1917. He was officially announced as on a flying status from Oct. 5, 1917 and rated as a Junior Military Aviator from Nov. 13, 1918.

At the outbreak of the World War he was appointed temporary Lieutenant Colonel, Aviation Section, Signal Corps, Aug. 5, 1917, and promoted to be temporary Colonel, Aviation Section, Signal Corps Feb. 26, 1918. He was honorably discharged from his temporary commission June 30, 1920. He was permanently transferred to the Air Service, Regular Army, Aug. 6, 1920.

During the World War, General Fechet was in command of various aviation fields,—Scott Field, Carlstrom Field, Dorr Field and Kelly Field. He was Department Air Service Officer of the Southern Department from May, 1919 to Sept., 1920, when he was assigned to duty in the Office of the Chief of Air Service, first as Chief of the Training and Operations Group and later as Chief of the War Plans Division. On July 1, 1924, he was detailed as Commandant of the Air Service Advance Flying School at Kelly Field, Texas. On April 27, 1925, General Fechet was appointed Assistant Chief of Air Service with the rank of Brigadier General, in which capacity he is now serving.

Comes of Fighting Stock

General Fechet comes of good fighting stock, has breathed the atmosphere of military precision and activity since childhood, and is a crack shot and a sportsman. He was a hard-riding cavalryman before shifting over to the air service. Modest and unassuming, he is not the type of man who seeks publicity, though he is about to be installed in another post where the limelight shines constantly.

"What does Colonel Fechet look like?" a staff officer in Washington was asked, after the announcement had been made that the commander of Kelly Field had been selected for General Mitchell's job.

"Look like? Did you ever see a Frederic Remington picture of the hard riding cavalry officer? Well, Jim Fechet is a dead ringer for that picture. . . . He looks exactly like a Remington cavalryman. Whenever you have a chance to meet Jim Fechet just take a good look at that fighting jaw of his. They don't make soldiers any better than Jim. He comes of good old army stock, and I think he inherits some of it from his father, who was a famous cavalryman."

The newly selected Chief of Air Corps is the third of his family to be in the regular army. He is of French Huguenot extraction. His forebears settled in Michigan before the Civil War. His father was Colonel Edmond Gustave Fechet, who was brevetted for gallant service in the Battle of Antietam. He retired in the Summer of 1898, several months after the son had enlisted as a private in the cavalry. His uncle was Colonel Eugene O. Fechet, who, after active service in the Civil War, resigned from the army in the Spring of 1875, because he found peacetime service too irksome, and went to Egypt to become a colonel in the Army of the Khedive.

Elder Fechets in Civil War

When the war with Spain broke out Colonel Eugene O. Fechet, though he had been out of the army for nearly a quarter of a century, decided that it was his duty to return to the colors. He became a major of volunteers in the Signal Corps in May 1898, at the age of 52 and continued in active service until the Spring of 1910.

Both of the elder Fechets went to the front at the beginning of the Civil War with Michigan troops. Colonel Edmond G. Fechet went as a sergeant of the Seventh Michigan Infantry, afterwards going to the Tenth Michigan Cavalry, while Colonel Eugene O. Fechet, the uncle, served four years in the Civil War as a sergeant of the Second Michigan Battery of Artillery. In the Summer of 1864 the uncle entered West Point, and on his graduation in 1868 he became a Lieutenant of artillery. He was the only one of the three who had the advantage of the West Point curriculum.

Thirty Entrants in National Air Tour

Thirty entrants are expected for the Annual National Air Tour for 1927. The advance guard for the annual demonstration of the reliability of American airplanes recently completed a 4,000 mile tour over the proposed course of the tour, to arrange for the reception and serving of the planes that will make the flight.

The advance party composed of managing officials of the tour left the Ford Airport at Dearborn, Mich., in a tri-engined Ford plane belonging to the U. S. Navy. On board were Ray Cooper, tour manager, Ray Collins, referee, and James V. Piersol, Frank Bogart and Hugh C. White, newspapermen. Five naval men, including two pilots, completed the pathfinder crew for 1927. The plane was piloted by Lt. Rutledge Irvine and Lt. Fred Nelson, both of the U. S. Navy.

The route decided upon for the Annual National Tour is as follows: Buffalo, Geneva, Schenectady, Boston, New York and Pittsburgh are among the first to entertain the tour. Then the fliers will take their machines west, stopping at Cleveland, Dayton, Cincinnati, Indianapolis, Memphis, Pine Bluff, and Dallas, Texas. Here the route turns north to Omaha, Neb., and passing through Tulsa and Oklahoma City. From Omaha they will return to Detroit through Chicago and Grand Rapids.

A two week schedule has been prepared for the tour, providing many severe tests relating to reliability, which will bring the aerial tourists back to Detroit on July 17. The Edsel B. Ford Trophy will be awarded to the winner of the contest.

Ryan NY-P a Development of the Ryan M-2

Both Powered by Wright "Whirlwind" Engines and Construction is Essentially the Same, but Colonel Lindbergh's Plane Includes Additional Features that Make for Greater Speed and Endurance

THE RYAN NY-P in which Col. Charles A. Lindbergh made the flight from New York to Paris is a development of the Ryan M-2. The construction is essentially the same though there are some typical features which are not included in the Ryan M-2. In the development of the Ryan NY-P all the structural members were redesigned for the full load. The plane was designed by Donald Hall, chief engineer of the Ryan Airlines, Inc., and its construction was supervised by William H. Bowlus, manager of the company.

Cockpit All Enclosed

The wing, which has a Clark Y section, is of conventional and fabric construction being built in one piece. The spars are built up box section using spruce and two ply mahogany with grain running at 45 deg. Plywood, supplied by Haskelite, is used to cover the top and bottom of the leading edge of the wing. The ribs are of square spruce members built into a truss with plywood gusset plates at the joints, are placed eleven inches apart. The compression members of the drag trussing are simply square wooden members reinforcing the ribs, while the tension members are of wire. The wings are covered with fabric and six coats of aluminum pigmented dope.

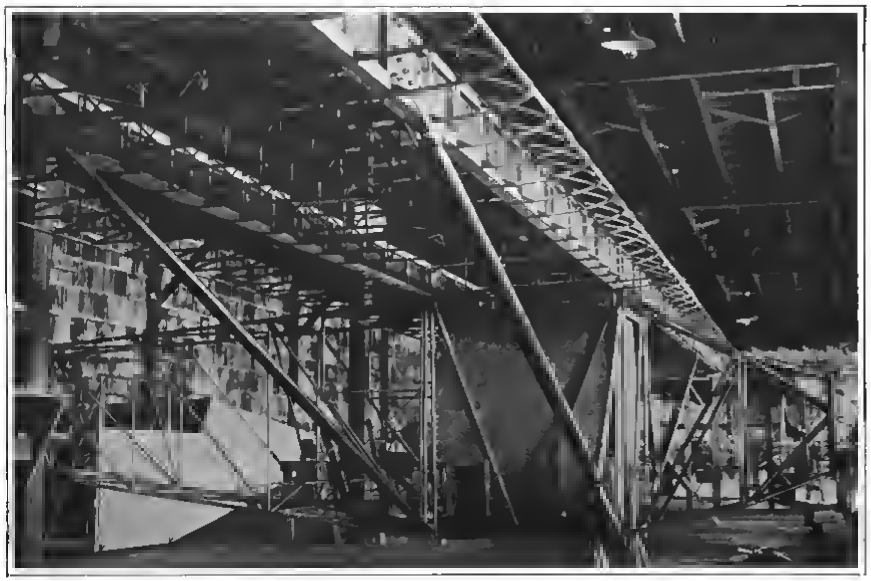
In plan form the tip of the wing is an airfoil. To reduce the moment arm the aileron area was made less than that of the Ryan M-2. By putting the aileron inboard of the wing tip, the wing tip deflection is increased and it is claimed that the aerodynamical efficiency is increased.

Four fittings above the gasoline compartment in the fuselage and the outboard struts attach the wings to the fuselage. The outboard struts are of steel having an airfoil section giving some lift.

The fuselage is of welded steel tubing, but welded throughout. No wires are used for bracing purposes as the Warren truss system is employed. The engine mounting is built separately of steel tubing and pinned to the fuselage proper by four nickel steel bolts.

The cockpit is entirely enclosed, and is placed to the rear of all fuel tanks for safety and balance. Due to the fact that the fuel tanks obscure all vision directly forward, a periscope was arranged to provide vision ahead. This periscope consists of two 45 deg. mirrors suitably mounted and reflect the image on the instrument board directly in front of the pilot. The periscope can be extended on the left hand side of the fuselage at about eyelevel or can be drawn in out of the way. Additional visibility is obtained through windows at each side of the fuselage, and by a skylight in the wing. An air scoop provides fresh air in the cockpit at all times.

The landing gear is of the split axle type and hinged at the lower longeron. The shock absorbers are of elastic chord and mounted vertically between the axle and the forward wing strut. The upper end of the shock absorber mechanism



The internal structure of the wing and fuselage showing the main fuel tank and the engine mount.

is braced to the upper and lower longerons, forming a tripod bracing. The shock absorber units are of the trombone type with a six and a half inch rise using shock absorber chord of eight individual links. The entire mechanism is streamlined, increasing the speed of the plane several miles per hour. A chrome molybdenum steel tube, heat treated to 180,000 lb. per sq. in., is used as the axle. For the sake of safety the tread is wider than that on the Ryan M-2. The tail skid is steerable and is also constructed of heat treated chrome molybdenum steel tubing.

Stock Model Whirlwind

The engine of the Ryan NY-P is a stock model, Wright "Whirlwind" J5C. All the tanks are of terneplate. The gasoline tanks were designed to have a capacity of 425 gallons, but resulted in 450 gal. In the fuselage are two tanks, one 210 gal. in the center of the fuselage and another of 88 gal. in front of it in the engine mount. In the wing are three smaller tanks with a volume of 152 gal. giving a total capacity of 450 gal. To the rear of the engine, acting as a firewall, is a twenty-five gallon oil tank.

Leads from all fuel tanks are brought to a central manifold located on the instrument board. Here a series of valves are arranged controlling each tank and the feed to the carburetor so that the pilot can use any or all tanks.

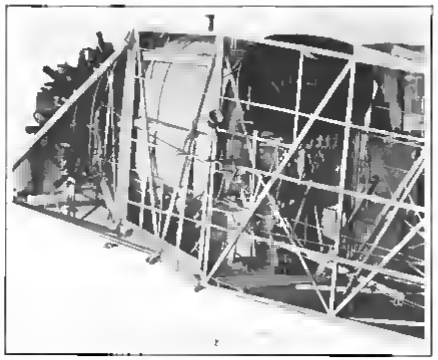
A small tank of about ½ gallon capacity is mounted on the back of the instrument board with a sight glass gauge and separate control, and is intended for consumption tests. The fuel is pumped from the various tanks through the manifold to the carburetor by means of a C-5 fuel pump, engine driven. A hand pump beside the pilot's seat enables him to pump gasoline from any one tank to another, affording protection against losing gasoline in the event that one tank should spring a leak. If the plane had been forced down over the ocean, Lindbergh could have pumped his load of gasoline out of the plane to keep it afloat. The pump works at the rate of 30 gallons an hour. The result of this arrangement is that there are two complete fuel systems to the engine. The gasoline lines from the engine to the main tank are only two feet long and "floated in rubber" to prevent trouble from vibration.

Empennage Similar to M-2

The engine and mounting are well cowled in, ending in a neat nose spinner on the Standard Steel propeller. All cowls are polished to give a machined effect.

The empennage is similar to that on the M-2, all the tail surfaces being of conventional steel tube construction. The rudder is balanced. A conventional type stick control is used. The rudder controls are of stirrup type using flexible cable.

Provision is made for adjustment of the horizontal stabilizer through a hand lever mounted on the left side of the



The Ryan NY-P fuselage without covering showing internal installations

cockpit. This apparently has been set for the trip, and no attempt has been made to determine the angle of throw of the lever, but it appears that the rear beam of the stabilizer has a travel of about half an inch. (The leading edge being hinged to fuselage.)

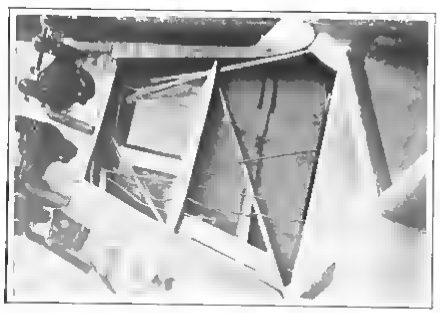
The instruments installed include an earth inductor compass, mounted aft of the cockpit with the controller convenient to the pilot's right hand and the indicator directly in front of the pilot, a magnetic compass, air speed indicator, bank and turn indicator, speed and drift meter, speed time (stop watch), MotoMeter (heat indicator), oil pressure gauge, ignition switch, oil temperature gauge, and an econometer developed by Lindbergh.

The fuselage is exceptionally well streamlined. Longitudinal sections of the fuselage in any direction give smooth curves from the propeller spinner to the tail. The propeller is of duralumin; set at 16¼ deg. pitch. There is a fillet streamline between the bottom of the wing and the fuselage. An exceptional amount of balsa wood was used in the NY-P, in the outboard struts, fillets, and in the fuselage for streamlining.

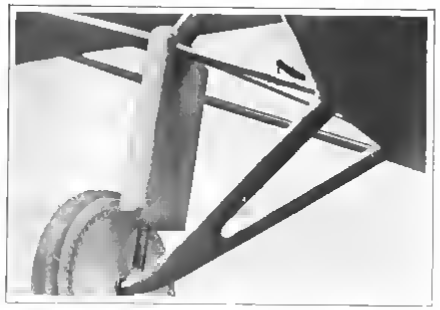
The general dimensions and specifications of the plane are as follows:

GENERAL

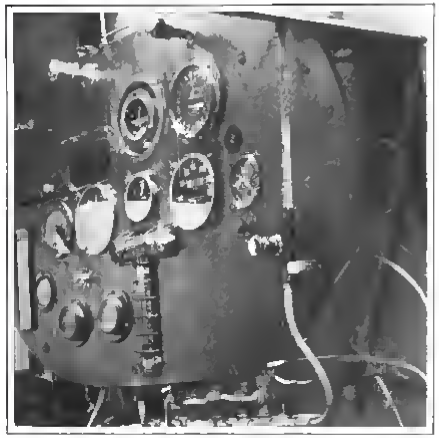
Span	46 ft. 10 in.
Chord	7 ft.
Length	38 ft.
Wing Area	319 sq. ft.



The Oil Tank and the Forward Fuselage Fuel Tank on Lindbergh's monoplane



The landing gear and shock absorber of the Ryan NY-P



The Instrument Board on the Ryan NYP

Aerofoil ..... Clark Y

WEIGHTS

Engine Wright J-5-C giving 223 B.H.P. at 1600 r.p.m.

Propeller—Standard Steel Propellar Co.—dual set at 16¼ deg. pitch.

Empty complete with instruments ..... 2150 lb.

Useful Load

Pilot 170

Miscellaneous 40

Gasoline—450 gal. (Western at 6.12 lb. per gal.) 2759

Oil—25 gal. at 7 lb. per gal. 175

3144 lb

Gross weight fully loaded at start of flight 5294 lb.

Other reports state that the total load of the plane on the take-off was 5150 lb., the greatest load ever lifted, up to that time, with a single Wright Whirlwind engine.

Gross weight lightly loaded at end of flight without gasoline and food, but with 10 gal. oil left 2415 lb.

LOADING

Wing Loading (Full load at start of flight 16.6 lb./sq. ft.
(Light load at end of flight 7.57 lb./sq. ft.

Power Loading (Full load at start of flight 23.7 lb./B.H.P.
(Light load at end of flight 10.8 lb./B.H.P.

CALCULATED PERFORMANCE (R.P.M. data based on test and theory)

Maximum Speed (Full Load ..... 120 M.P.H.
(Light Load ..... 124.5 M.P.H.

Minimum Speed (Full Load ..... 71 M.P.H.
(Light Load ..... 49 M.P.H.

Economic Speed (Full Load ..... 97 M.P.H.
(Light Load ..... 67 M.P.H.

Fuel Economy at Economic Speeds

Full Load with full rich mixture 6.95 mi. per gal.

Light Load with lean mixture 13.9 mi. per gal.

RANGE

At ideal speeds of 97 start and 67 m.p.h. at end 4110 mi.

At practical speeds of 95 start and 75 m.p.h. at end 4040 mi.

FLIGHT TEST PERFORMANCE

Maximum Speed

With 25 gal. gas and 5 gal. oil—120 m.p.h.—over 3 mi. course

With full load of 425 gal. gas and 25 gal. oil—124 m.p.h. approximate based on calculated performance.

With 25 gal. gas and 4 gal. oil by air speed meter—128 m.p.h.

With 20 gal. gas and 4 gal. oil by air speed meter—127 m.p.h.

Take Off Distances

Tests made at Camp Kearney near San Diego, Calif. at 600 ft. Altitude. Oil—4 gallons.

Gallons Gas	Gross Wt	Approx. Head Wind Val.	Take Off Dist. Ft.
36	2600 lb.	7 m.p.h.	229 ft.
71	2800	9	287
111	3050	9	389
151	3300	6	483
201	3600	4	615
251	3900	2	800
301	4200	0	1023

Unique Water Making Cup for Airmen

A recent invention for use in trans-Atlantic work is the Armbrust life-saving water making cup. In case of an emergency at sea this device can produce fresh water for an indefinite period. It gives from one and one-half to two ounces of pure drinking water per hour. The water is produced by condensing the water vapor of the breath into pure drinking water.

To produce water with this device one must breathe through it when the device is subject to temperature lower than the temperature of the human breath. Such conditions would prevail during ship-wreck or an accident at sea. The device is flat and circular, about one inch thick, five inches in diameter, holds six ounces of water, and weighs six ounces empty. It hangs from around the neck and is attached to the life preserver jacket. As it floats, the possibility of the cup being lost is reduced to a minimum.

The construction of the cup enables anyone to breathe through it for hours at a time without fatigue. Though only eight ounces of water per day are necessary for life, the device will produce from twelve to sixteen ounces per day, basing the calculation only on the waking hours. The cup is made of non-corrosive material. It was invented and thoroughly tested by C. W. Armbrust of the International Life Saving Water Making Cup Corp., 204 Woodward Bldg., Washington, D. C.

The Armbrust life-saving water making cup was included in the equipment of Col. Charles A. Lindbergh on his New York to Paris flight. Commander Richard E. Byrd's planes are also equipped with them as were those of the late Commander Noel Davis and of the Late Comdr. John Rodgers.

Automatically controlled shuttered cowling for controlling engine cooling in Vought (Corsair) airplanes. Device insures proper cooling of the P. & W. (Wasp) engines under all conditions of temperature.

Companies Who Contributed to Colonel Lindbergh's New York-Paris Flight

Ryan NY-P Vendors

Steel Tubing	Ohio Seamless Tube Co., Shelby, Ohio
Steel tubing, Chrome Molybdenum steel tubing	Summerill Tube Co., Bridgeport, Monte Co., Pa.
Steel tubing	Service Steel Co., 206 W. 10th St., Los Angeles Calif.
Alloy Steels	Crucible Steel Co. of America, 17 E. 42nd St., New York City
Aluminum Sheet Metal, Aluminum Tubing	Aluminum Company of America San Francisco, Calif.
Sheet Metal	Dickerson Steel Co., Dayton, Ohio
Fabrics, tape, etc. Mr. Gaffney	E. S. Twining Co., 220 Broadway, N. Y. C.
Dope, dope thinner	Brown Leitheld Co., 1212 S. Olive St., Los Angeles, Calif.
Varnish	Valentine & Company, 456-4th Ave., New York, N. Y.
Metal primer, varnish	Bass Hueter Co., 117 Wilkardt St., Los Angeles, Calif.
Lacquer, Enamel, Bronze, Etc.	W. P. Fuller Co., 7th & "F" Sts. San Diego, Calif.
Spruce, Ash, Black Walnut	Sullivan Hardwood Co. 713 W. "G" St. San Diego, Calif.
Spruce	Posey & Company Portland, Oregon
Mahogany Ply	California Panel & Veneer Co., 955 Alameda St., Los Angeles, Calif.
Plywood	Haskelite Mfg. Co., 136 W. Washington, Chicago, Ill.
Balsa Wood	Fleischmann Transportation Co., 831 Washington St., N. Y. C.
Cottonwood Ply	White Brothers, 5th & Brannan Sts., San Francisco, Calif.
Celluloid, Upholstering	Henry B. Day Co., 1401 S. Los Angeles St., Los Angeles, Calif.
Waterproof glue	Hercules Glue Co., 323 Folsom St., San Francisco, Calif.
Lift-the-dot-Fasteners	Carr Fastener Co., 31 Ames St., Cambridge, Mass.
Tires and Tubes	Silvertown Cords—B. F. Goodrich Co., 229 B St., San Diego, Calif.
Wheels	Dayton Wire Wheel Co., Dayton, Ohio
Bolts, nuts, instruments and accessories	Nicholas-Beazley Airplane Co., 286 W. North St., Marshall, Mo.
Accessories	Johnson Airplane Co., Dayton, Ohio
Wires and Fittings	Roebling & Sons, 216 S. Alameda St., Los Angeles Calif.
Gasoline line, fittings, etc.	Luckenheimer Co., Cincinnati Ohio
Gasoline and oil tanks and all aluminum cowling	Standard Sheet Metal Works, 540 7th St. San Diego Calif.
Hose clamps	Ideal Hose Plant Co., 200 Bradford St. Brooklyn, N. Y.
Propeller	Standard Steel Propeller Co., Pittsburgh Pa.
Wright Whirlwind Engines	Wright Aeronautical Corp., Paterson, N. J.
Aircraft and Cars	Airships, Inc., Hammondsport, N. Y.
Amherst Life Saving Water Making Cup	C. W. Amherst, 204 Woodward Bldg., Washington, D. C.

Principal Accessories on Wright Whirlwind Engine

Magnetos	2 Scintilla Aircraft Magnetos, model AC 9D, made by the Scintilla Magneto Co. Inc. Sidney, N. Y.
Carburetor	Stromberg Motor Devices Co., 58 E. 25th St., Chicago, Ill.
Spark Plugs	A C. Spark Plug Co., Flint, Mich.

Instruments on NY-P

Earth Inductor Compass	
Magnetic Compass	
Air Speed Indicator	Pioneer Instrument Co., 754 Lexington Ave., Brooklyn, N. Y.
Bank and turn Indicator	
Speed and drift meter	
Speed timer (stop watch)	
Lateral and longitudinal Inclinometer	
Jones Isothermster	Consolidated Instrument Co., 41 E. 42nd St., N. Y. C.
Motometer	Mote-Meter Co., 15 Wilbur Ave., Long Island, N. Y.
Eight day clock	Waltham Natal Watch Co.
Economeyer	Developed by Lindbergh and built by Ryan Airlines, Inc.
Oil Pressure Gage	War Stock

Fuel

Gasoline	Standard Oil Co. of California
Oil	Vacuum Oil Co., New York City

Features of Standard Steel Propellers

Standard Steel Propellers were originally developed with the idea of avoiding the well known difficulties encountered with warping and splitting of fragile wooden propellers.

One of the principal features of the Standard Steel Propeller is the advantage of the adjustable pitch construction and the method of adjusting the pitch. A scale of angles is marked on the hub and a reference line on the blade so that the pitch may be adjusted without taking the propeller off the plane by simply loosening the bolts on the clamp ring which can be done with an ordinary wrench.

The propeller used on the "Spirit of St. Louis" by Captain Lindbergh on his Trans-Atlantic Flight was set at a pitch of 16.25 deg. at the 42" station.

Where economy of fuel is an important factor, a high pitch setting will hold the engine down to a low r.p.m. and give the most mileage per gallon. A low pitch setting will allow the engine to turn up fast to take-off in a small field. Where racing or any type of flying on which top speed of the airplane is most important, an intermediate setting between high and low is available.

Standard Steel Propellers consist of an alloy treated steel hub and two or three, as case may be, special aluminum alloy blades. In order to facilitate interchangeability and adjustment of the pitch, the hubs of these propellers are made in two halves. Two shoulders are turned on the ends of the blade. The blades are inserted in one half of the hub, the other half then placed over the blades and the two halves clamped together. The shoulders on the end which hold the blades in place are designed to give approximately equal strength in shear, compression and tension. The physical properties of the blades average as follows:

Tensile Strength	55,000 lb.
Elongation	16%
B H N.	90

and the physical properties of the hubs at 3 component parts average as follows:

Tensile Strength	130,000 lb
Elastic Limit	115,000 lb.
Elongation	15%
Reduction of Area	50%

Another great advantage of the adjustable blade feature of the Standard Steel Propeller is the fact that frequently only one blade is damaged in a crash or bad landing so that the good blade may be kept in use and the damaged blade replaced. Damaged blades can be repaired by the Standard Steel Propeller Company at a nominal cost and are therefore interchangeable.

An additional advantage of this type of propeller lies in the fact that the same propeller can be used on several different engines or planes by simply setting the pitch to a suitable angle. In this way a number of propellers, which it is necessary to carry in stock, may be reduced to a minimum and a greater percentage of equipment kept in service all the time.

Electrical Characteristics of Spark Generators

The electrical characteristics of spark generators are discussed in a report of the National Advisory Committee for Aeronautics, compiled by R. B. Brode, D. W. Randolph and F. B. Silsbee. This gives the results of an extensive program of measurements on eleven ignition systems, differing widely in types. The results serve primarily to give representative data on the electric and magnetic constants of such systems, and on the secondary voltage produced by them under various conditions of speed, timing, shunting resistance, etc. They also serve to confirm certain of the theoretical formulas which have been proposed to connect the performance of such systems with their electrical constants, and to indicate the extent to which certain simplified model circuits duplicate the performance of the actual apparatus.

A copy of the full report, No. 241, may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

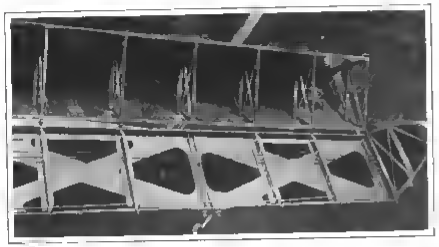
The New Rohrbach Rocco Flying-Boat

Of All-Metal Construction, Powered by Two Rolls-Royce, Condor III 650 Hp. Engines and Carries Ten Passengers

ROCCO IS the name given to the latest type of flying-boat developed by Dr Ing A Rohrbach, the famous German aircraft designer Similar to the other Rohrbach airplanes and flying-boats it is of all-metal construction employing high lift semi-cantilever wings, set at a high dihedral angle. Large pontoons are set fairly close to the hull The Rocco differs from the earlier Rohrbach models in that tapered wings are used in place of the constant-chord constant-section wings.

This ten passenger plane is equipped with two Rolls-Royce Condor III 650 hp engine placed side by side high above the wings. In placing the engines, questions of maneuverability on the surface were considered and it is claimed that better control on the water is obtained with the engines in such positions With the engines placed close together on the upper surface of the wing there is less off-setting of the thrust in case of engine stoppage than in many twin-engined planes, and what there is, is easily taken care of by an adjustable stabilizer which can be set in a manner similar to horizontal stabilizer

In the issue of AVIATION for Mar 14, 1927, the construction of the typical Rohrbach wing was described in detail. The Rohrbach monoplane wing is one of the most interesting types of metal wing construction that has been developed Duralumin is used almost entirely, except for a few fitting and bracing struts which are of steel The surface or covering of the wing is used as a stress bearing part of the structure. The wing forms a large box girder of such size that what would normally be the forward and rear spars are the side members of the box The duralumin sheeting, used for the wing covering, acts as top and bottom members of the box. The webs of the spars are made of flat duralumin sheeting cut out with a nibbling machine so as to form a Warren truss This is stiffened at the top and bottom of the web by two metal channel sections, bent out at right angles to the beam so that the whole assumes the form of

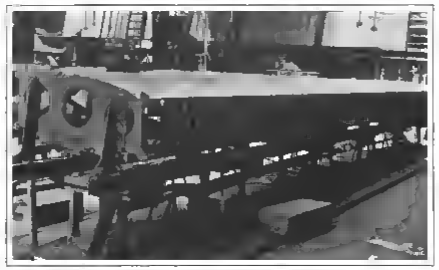


Hinged leading edge of Rohrbach

an I beam, very thin and wide, and with the web cut into a Warren truss The forward and rear spars are joined by fore and aft members acting as formers or ribs The ribs are of sheet metal lightened with round holes They are reinforced by cap strips and Vee stiffeners. The cut out holes are flanged over to increase the strength.

The covering is flat duralumin sheeting No corrugation is used By the proper use of stiffeners inside these sheets it is claimed that greater strength weight ratios can be obtained since the surface area of the metal is considerably less The covering is riveted to both the ribs and the spars The gage of the sheeting used for the covering varies from point to point according to the stress This is effected both by using sheeting of different gages and by the lamination of the sheets.

The unique arrangement of the leading and trailing edges is also described in AVIATION for March 14, 1927. Due to the closed box truss construction of the wing, the leading and trailing edges are hinged By removing a few bolts the leading or trailing edges can be swung either up or down. This arrangement has many uses. In riveting the covering to the



Wing section of Rohrbach Rocco

ribs or spars the rivets are accessible for bucking through the holes left by the trussing of the spars. The interior of the wing can easily be inspected, or repaired. Should any water get in the wing in taxiing it can be quickly drained.

As a safeguard against the plane turning over, in case of damage to one of the floats, the outer portion of the wing is formed into water-tight boxes and as these boxes are at a long lever arm they can prevent the plane from turning over, though it may float at an uncomfortable angle.

The later models of the Rohrbach flying-boat hulls are very narrow having a sharp Vee bottom The older models had a flat bottom causing undue stresses in the hull on landing. Following the most modern practice, there are two steps, both of the closed type As in the wings, the covering is used to give strength, and it varies in thickness according to the stress It is of flat duralumin except on the top or deck where the duralumin has been fluted or corrugated to stiffen the deck and enable anyone to walk along it. Rivets are used throughout. At all points the rivets are accessible for inspection or repair

Bulkheads divide the hull into a number of watertight compartments. The foward compartment is used as a collision compartment. It contains the equipment for handling the boat on the water, such as an anchor, winch, boat hooks, rope, hoists, tackle, etc and also contains such emergency equipment as a radio antenna mast, sails, and such equipment to bring the flying-boat into port under sail in case of emergency.

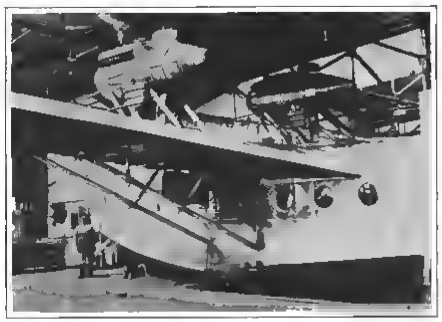
Behind the collision bulkhead is the pilot's compartment. The Rocco is equipped with dual side by side control As the hull is of fairly narrow beam and the pilot is in front of the wing vision is very good Adjoining and to the rear of the pilot's compartment is the radio apparatus. It is separated from the pilots cockpit by a bulkhead with a

water proof door. In this room, which is 3 ft. by 4 ft. 11 in., is a table seat, and also the auxiliary engine. The engine is housed in a sound proof box.

The passenger's cabin is broken into two sections, divided by a watertight bulkhead. It is 22 ft. 4 in. long and 5 ft 7 in. wide. There is ample head room for one to stand upright in any part of the cabin. The forward section of the cabin is arranged to accommodate four passengers and the rear section six. The cabin is designed to eliminate the noise of the engines. It is provided with very comfortable seats covered with leather. The cabin is lighted and heated electrically. Entrance is provided by a hatch in the deck at the rear section of the cabin. There are portholes that serve as windows and, like the doors and hatch covers they are watertight when closed. Behind the passenger's cabin is a compartment used as a lavatory and washroom similar to the cabin and which is also provided with electric lights. From the bulkhead behind this compartment to the rear of plane is a section used for freight and baggage. It is 4 ft. 11 in. long and 4 ft 3 in. wide (mean width). Due to the arrangement of the bulkheads the plane will stay afloat with any two of the compartments damaged.

The engines are mounted on a tubular structure well above the wing and are well cowled in. Due to the high position above the wing it is claimed that the engines and the propellers will be free from any spray. Behind each engine and inside the cowling are the oil tanks. Gasoline is carried in the leading edge of the wing between the engine and the hull. With the tanks in the open and no fuel lines crossing through the hull the risk of fire is small. However, an automatic fire extinguisher, controlled from the cockpit, is provided. The auxiliary engine, carried in the wireless compartment, is a Bristol gas starter. It is used to drive the electric generator, bilge pumps and since the fuel tanks are below the engines, to drive the fuel pumps.

A wind driven generator is used to provide current for the wireless when the plane is not in flight. On the surface the Bristol gas starter drives the electric generator. The



Rohrbach Rocco

auxiliary mast supports the radio antenna while on the surface, and the range of the transmitting and receiving apparatus for both telephony and telegraphy is from 95 to 375 mi.

A complete set of navigation instruments of the most modern design is employed. They include a combination of climb and air-speed indicator, two compasses, both of different construction, a sextant, employing an artificial horizon, two electrical and two mechanical tachometers, oil pressure gages, oil and water thermometers, etc.

It can readily be seen that every effort has been made to make the Rohrbach "Rocco" flying boat a machine eligible for the roughest kind of service. It is equipped to meet every possible emergency, even to the point of carrying sails and a mast so that in case of engine failure it can proceed to port under sail.

The general dimensions and performance are as follows:

Length (over all)	63 ft. 3 in.
Span	85 ft. 3 in.
Height (over all)	21 ft. 9 in.
Wing area	1,010 sq. ft.
Tank capacity	536 gal.
Weight (bare)	12,750 lb.
Service equipment	440 lb.
Total empty weight	13,190 lb.
Fixed equipment	1,010 lb.
Loose equipment	880 lb.
Crew of 3	550 lb.
Consumable load	3,520 lb.
10 passengers	1,650 lb.
Luggage	330 lb.
Total load carried	7,940 lb.
Total loaded weight	21,130 lb.
Permissible over load	1,950 lb.
Highest permissable total loaded weight	23,110 lb.
Full speed at sea level at normal load	136.5 m.p.h.
Cruising speed	104.3 m.p.h.
Landing speed	69.3 m.p.h.
Climb to 1000 ft.	5.8 min.
Absolute ceiling	10,350 ft.
Range with normal load at cruising speed	808 mi.
Range at full permissible load with tanks full and at cruising speed	1,490 mi.

These figures are guaranteed to 5%.

Superchargers Part of Regular Engine

Among the engines recently developed using built-in superchargers are those built by the Pratt & Whitney Aircraft Corporation and the Wright Aeronautical Corporation. The Wright "Simoon" and their new heavy-duty engine "Cyclone," have developed 350-horsepower and over 550 horsepower respectively. The Pratt & Whitney "Wasp" and "Hornet" engines have developed respectively 425 horsepower and 550 horsepower.

Superchargers have been in frequent use on airplanes ever since the war, but applications have been few and principally on aircraft designed for high altitude flights. The practice in the past has been to modify standard engines to accommodate an external supercharger, but the rapid advance in research which has taken place in the past few years has resulted in the design of a supercharger which is rapidly being adopted by all leading airplane manufacturers in this country for engines in sizes up to about 600 horsepower. This device is made a unit part of the engine.

The supercharger involved in the new type engines is designed primarily to improve the gasoline distribution and to give a small amount of supercharging when flying near sea level. It consists of a high-speed impeller driven by the engine shaft through gears surrounded by air conduits of the proper shape formed as a part of the engine crank case. The only extra parts, therefore, are the comparatively small impeller and a pair of gears.

The recent records set by the Chance Vought Corp. were made with a Pratt and Whitney Wasp engine with a built-in supercharger.

The United States Navy is now using a large number of 'planes which are driven by this type of engine. All of these machines are equipped with superchargers developed especially for the purpose by the General Electric Company.

General Electric Co. Holds Demonstration Of Modern Aviation Beacon Lights

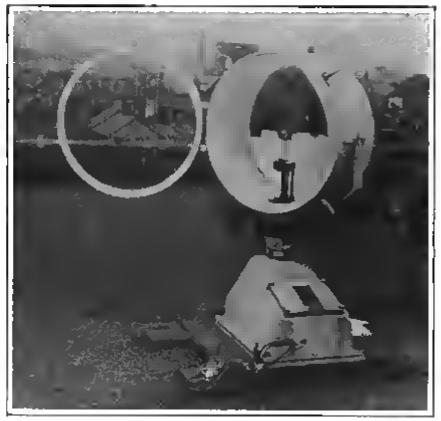
Exhibits New Light Source Developments to Representatives of the Army, Navy, Bureau of Standards, Department of Commerce and Air Mail

VARIOUS new types of light sources for beacon lights which are being developed by engineers of the Edison Lamp Works of the General Electric Co., and the Cooper Hewitt Electric Co. were demonstrated at the Edison Lamp Works of the General Electric Co. at Harrison, N. J. on June 10. The demonstration was made before representatives of the Army and Navy Departments, the Bureau of Standards, the Department of Commerce, and the Air Mail.

Tests were made with various types of beacons placed on the roof of the laboratory and observed from Eagle Rock, West Orange, N. J., a distance of six miles. The new lamps consist of high frequency induction lamps, both Neon and Mecnry. They have the advantage over the long tube neon lamps of offering a high candlepower light source of sufficient concentration to enable its use in a search light, thus producing a beam of many thousand candlepower and of distinctive characteristics. This makes it possible to infallibly pick out the beacon light among many other surrounding light sources. It is claimed that the neon light also has better penetrating characteristics than lights of shorter wave lengths. In spite of the greater penetration of the neon lamp the Mazda beacon is still best for the purpose because it is possible to use a more concentrated white light which used with a searchlight reflector produces much greater beam candlepower than any neon lamp. The neon lamp under the present development being without filament and merely an illumination of gas within a bulb, does not produce the concentrated brilliance of the mazda lamp, which is necessary if the light is to be used in a search-light reflector.

The illumination of the gas is produced by placing the bulb within a coil through which a high voltage and high frequency current are passed. The voltages are in the vicinity of 15,000 to 40,000 volts while the frequency is usually between 5,000 and 60,000 cycles. The pressure with in the bulb is approximately .001 atmospheres.

"The Neon lamp is still in the experimental stage" L. C. Porter, engineer of the Edison Lamp Works, and T. E. Fonlke of the Cooper Hewitt Electric Company, in charge of the demonstration pointed out. "Perhaps we may be able to find a means of producing neon light more concentrated and of greater brilliance. If we do it surely will have a great advantage over the white light for these tests have shown the pinkish glow can be seen further under all conditions. The new type bulb, or Neon Induction Lamp, is a decided improvement over the neon tube light, which the



High candlepower neon induction lamp in G. E. 24" beacon

Group of Army, Navy and Dept. of Commerce officials inspecting equipment of induction lamps.

public is somewhat familiar with because of its use in advertising signs. With the induction spherical bulb of but one and one quarter inches in diameter we can secure the same candlepower that many hundred feet of neon tube light would be required to produce. Realizing the fog is one of the outstanding terrors of aviators, we have been busy for two or three years at the Cooper-Hewitt laboratory in Hoboken, as well as the Edison Lamp Works here, trying out various kinds of light, hoping to find a light which will be able to guide aviators under the most adverse conditions. We have tried various types of mercury and caesium lamps as well as the neons, and have come to the conclusion that the pinkish neon light is best if we are able to find a way of producing this light of greater concentrated brilliance.

"At present the high brilliancy of the tungsten filament in the mazda lamp enables the production of a searchlight beam of many times greater candlepower than has been obtainable with neon and thus more than offsets the greater fog penetrating ability of the neon lamps. Then too, at present there is greater simplicity in the operation of the mazda lamp as well as an appreciable difference in costs."

In the demonstrations, the mercury lamp was also shown as well as the neon and the mazda. Observations from Eagle rock were made with field glasses and various light recording instruments. The possibility of using color screens

L. C. Porter, left, holding 10 kilowatt Edison Mazda Lamps and T. E. Foulke center holding 30,000 candlepower high frequency neon induction lamp. This bulb has no filament but lights with a pinkish glow when placed inside the coil held by assistant at the right. Both lamps developed for aviation lighting.

on the Mazda beacons, so that such gliding lights could more readily be picked out, especially when the beacon might be near the city with its thousands of other lights, was also demonstrated.

The development of the Neon Induction Lamp is mainly due to the efforts of Mr. Foulke and Mr. Porter assisted by Mr. Garritson and Mr. Radcliff of the General Electric Company. The work has covered a period of about five years while the present tests, demonstrated on June 10, have covered almost four months.

The demonstration was divided into six groups. The first consisted of a comparison of neon and mazda beacons of equal candlepower with and without color screens followed by a similar comparison of mercury and mazda beacons. In the third group the bare neon and mercury lamps of high candlepower were compared with a bare mazda lamp of equal candlepower. This was followed by a comparison of a twelve foot neon tube with the neon induction lamp beacon of equal wattage. Group five showed the present type of mazda lamp beacon operated at various beam candlepowers. The last was a demonstration of the mazda lamp beacon with various color screens to secure contrast with the surrounding lights.

It is unfortunate that the night was so clear that a comparison of the fog penetration of the beacons could not be made. Though the mazda light with a red screen in front of it seemed to be the most distinctive on a clear night Mr. Foulke claims that the neon light is better in foggy weather. The mercury lamp did not give a sufficient contrast to the surrounding lights to give it any advantage over the surrounding lights. The neon induction lamp had a much greater brilliancy than the twelve foot neon tube.

Among those present were: Capt. F. C. Hingsburg, Supt. of Airways, Dept. of Commerce; Lt. M. F. Schoeffel, U. S. Navy; Lt. L. Cooper, U. S. Navy; Comdr. R. D. Tisdale, U. S. Navy; Maj. Wm. R. Blair, Army Signal Corps; Maj. G. C. Brant, U. S. Army; Mr. Truscott, N.A.C.A., A. E. Peterson, Air Mail Service, F. C. Brekenridge, U. S. Bureau of Standards; W. T. Harding, U. S. Army, E. P. Critchley, Hadley Field, W. L. Smith, Air Mail Pilot; H. Chandler, Air Mail Pilot; Captain Biddlecombe, Colonial Air Transport, Capt. A. E. F. Horn, General Electric Co.; Col. R. P. Parrott, General Electric Co.; T. E. Foulke, F. Garritson, Mr. Radcliff and W. A. D. Evans of the Cooper Hewitt Electric Co., and L. C. Porter, G. F. Prideaux, A. C. Roy, H. Schroeder and E. O'Conner of the Edison Lamp Works of the General Electric Co.

Radiator Resistance and Cooling

Report No. 261, covering "Resistance and Cooling Power of Various Radiators," compiled by R. H. Smith, for the National Advisory Committee for Aeronautics, combines the wind-tunnel results of radiator tests made at the Navy Aerodynamic Laboratory in Washington during the summers of 1921, 1925, and 1926, and submitted for publication to the National Advisory Committee for Aeronautics, Nov. 29, 1926. In all, thirteen radiators of various types and capacities were given complete tests for the figure of merit. Twelve of these were tested for resistance to water flow and a fourteenth radiator was tested for air resistance alone, its heat dissipating capacity being known. All the tests were conducted in the 8 by 8 ft. tunnel, or in its 4 by 8 ft. restriction, and under conditions as nearly the same as possible. That is to say, as far as possible, the general arrangement and condition of the apparatus, the observation intervals, the ratio of water flow per unit of cooling surface, the differential temperatures, and the air speeds were the same for all. Also, for reasons of comparison, the L/D value of 6, which was assumed in the 1921 tests as the L/D of the airplane using the radiator, was also used in the more recent tests.

No attempt is made to enter upon the theory of heat dissipation. Only the actual test results are given and reduced to coefficient form. The precision of the tests as representative of full-flight performance is definitely known only in the case of the HN-2. The McCook Field full-flight performance and the Navy tunnel performance of this radiator agree within about 3 per cent.

Since this full-flight test was made with unusual care and since the wind-tunnel tests on all the radiators were made not only accurately but also at almost full scale, it would seem probable that these tests represent quite accurately the full-flight performances in actual service.

Report No. 261 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

Robertson Makes Record Purchase

What is believed to be one of the largest single purchases of OX5 engines in the field of commercial aviation took place recently, when the Robertson Aircraft Corporation, of Anglum, Mo., closed a deal whereby they purchased the entire stock of the Curtiss Aeroplane & Motor Company's stock of OX5 engines and parts, at Garden City, L. I., N. Y.

America Welcomes Colonel Lindbergh

(Cont from page 1351)

ha was in the air again on the way to the Narrows of New York harbor. Circling once or twice Captain Eaker landed and transferred his famous passenger to the city boat "Macon" which conveyed him to the Battery and the beginning of the never to be forgotten parade up Broadway and Fifth Avenue to Central Park.

Parades to Central Park

Sirens, shrill tooters, full-throated whistles on the flotilla burst into bedlam as he landed. Further up the bay and at the piers the deeper note of the liners came in ear-splitting punctuations into the uproar. Millions beheld his blond boyish head as he rode through six miles of streets and cheered from the depths of their hearts.

Then through a white "mist" of twisting paper, falling like silver flakes, the airman started up Broadway's canyon. Every window held spectators—waving, cheering spectators—and on either side he saw the thick masses of those on the sidewalks. Through this swaying, surging, eager throng he came to the City Hall, brilliant in the sunshine, resplendant with colors, and peopled by 100,000. Three white-robed women trumpeters sounded a piercingly clear signal as his car turned into the driveway to the Mayor's stand.

Colonel Lindbergh stepped from his car and was escorted to the Mayor to whom he was formally introduced by Mr. Whalen. The Chairman of the committee briefly recounted the circumstances of the famous take-off at Roosevelt Field and presented the flier as "the man who has won the love and admiration of the world." Before the Mayor gave his address of welcome, an illuminated scroll, testifying to the esteem in which the city held him, was read and presented to Colonel Lindbergh. He accepted it with his abrupt little bow and his quick flashing smile.

(Acme)

Colonel Lindbergh landing with Vice Admiral Burrage

After the Mayor pinned the city's medal on Colonel Lindbergh, the flying hero spoke of his European receptions and declared New York's to be the most stupendous of all.

Accompanied by the Mayor and Mr. Whalen Colonel Lindbergh continued his triumphal procession towards Central Park stopping at Madison Square to place a huge bunch of roses at the Eternal Light, commemorative of the city's war dead.

Passing up Fifth Avenue the parade had paused to let the airman go to the head of the column. In this position he rode directly to the grand stand, and as he stepped to the side of Governor Smith the parade halted some distance down from the stand. A great outburst of enthusiasm came from the crowd—thousands of whom had been standing for seven or eight hours—as the tall form of the aviator came within vision.

Colonel Lindbergh places wreath at the base of the Shaft of Eternal Light, in Madison Square Park. The wreath was presented by the Overseas Nurses. Photo shows, left to right: Miss Clara Fletcher, of the Overseas Nurses, Colonel Lindbergh and Mayor James J. Walker

A few moments later Governor Smith put the blue ribbon, from which was suspended the State medal, over Lindbergh's head. The Governor read the inscription on the medal which was awarded for "courage and intrepidity of the highest degree in flying alone and unaided from New York to Paris to the glory of his country and his own undying fame."

After the Governor had spoken the flier remained on the platform in view of the thousands for thirty minutes as he reviewed the parade. When the last man had filed by, the flier and his mother entered a car and were driven away to begin a series of private individual and association receptions.

W. L. LePage Joins Pitcairn Aviation

Pitcairn Aviation, Inc., of Philadelphia, Pa., manufacturers of aircraft and the holders of the United States Air Mail Contract for the service between New York City and Atlanta, Ga., have recently secured the services of W. Laurance LePage formerly Editor of AVIATION, who has resigned from this position to take up actively in this new field of aeronautical work. Mr. LePage's wide experience in aeronautical engineering will undoubtedly prove of great value in his new activities in connection with both the Pitcairn air line and the engineering work of this organization.

James R. Fitzpatrick Made Vice-Pres.

James R. Fitzpatrick, who has been with the Huskelite Manufacturing Corporation, of Chicago, Ill., since a few months following its organization, in 1917, and who has served in the capacities of factory manager, purchase agent and sales manager, has been made vice-president of that company.

Meteorological Aspects of the 1927 National Balloon Race

Entries Benefitted by Radioed Weather Reports

By RALPH H. UPSON

THE GROWING meteorological character of balloon racing was evidenced by the fact that all but one of the contestant's in this year's National Balloon Race carried radio for the purpose of getting weather reports during flight. In most cases the sets used were of special design. As is usually the case, the winner would be the pilot who could use the existing weather conditions to the best advantage, or, in this case, it could almost be put the other way, by saying that the winner was the one who let the weather be the least handicap. To quote Mr. C. G. Andrus, meteorologist in charge of the Boston-New York-Chicago air mail route:

"It was a race with a distinct meteorological handicap. The progress of the low which appeared to be slightly northwest of Akron at the time of the take-off appears to have been put about equal to that of the better contestants. They had to keep ahead of it, not because there were better velocities of wind there but because in no other position could winds be found directed toward land expanses and therefore at the outset, it became a race with a geographical problem and an aerological problem. The unsettled weather did not help any.

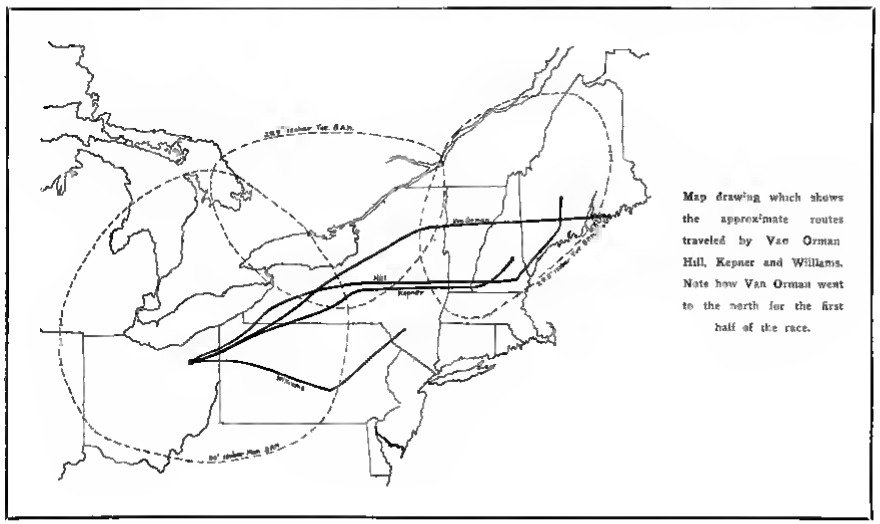
Southwest Wind Best at 2,000 Ft.

"From the geographical viewpoint, 'northing' (northward component) must be made either at the beginning or some other time during the race, the more the better since under the conditions imposed by the proximity of the sea the usually ubiquitous west wind of the higher altitudes would force the pilot with little northward mileage to be hedged by the seacoast. The wind aloft just behind the storm center appears to have been WNW, except at a transient level somewhat lower where it was west.

"This southwest wind attaining its best velocity at a level about 2000 feet above ground might well have been held during the first night, and with daylight a rise taken to a level that would have carried the balloon either east or east-northeastward. Too high an altitude the first night would have produced insufficient 'northing' and a resultant inability to get off to that part of the New England coast that stretches off to the northeast above Massachusetts.

Must Have Speed to Get North

"Whatever the wind drifts now appear to have been, the fact remains that the balloonists had to make the best of a state of extensive cloudiness and fog which hindered drift observations when the need of them was imperative for safety as well as for tactics. In addition to this obstacle, the fact of widespread condensation indicates the presence of a stratified atmospheric condition, in which layers of stable and instable temperature gradients were sandwiched between the surface and the higher altitudes. The 'low' itself bent on its course down the St. Lawrence valley dragged the balloonists with it hand in hand, offering them no escape to better weather, except at a sacrifice of geographic position, no relief from the threat of the old man of the sea and little respite from a constant watch on ballast and valve. Nevertheless, these same factors precluded the likelihood of the formation of that type of thunderstorm which draws the balloonist into high vertical currents and forms the type of lightning which jabs its bolts through great spaces of dry air to jeopardize



Map drawing which shows the approximate routes traveled by Van Orman Hill, Kepner and Williams. Note how Van Orman went to the north for the first half of the race.

the life and endurance of pilot and bag. The absence of accidents and fatalities in this race again testify to the truly remarkable safety of the balloon game as played by modern pilots, and is thoroughly gratifying."

The position of the dominant low as well as the routes of some of the balloons are shown on the map. As Mr. Andrus says, "It was necessary to get north, but it was almost equally necessary to get speed in order to be able to get north."

Routes an Interesting Comparison

The routes taken by the two leading contestants Van Orman and Hill offer an interesting comparison. Van Orman, instead of trying to get as much north as he wanted to, at first played more for speed by going to an altitude of between 3000 and 5000 feet, and remained there until on passing the Adirondacks the altitude was increased to 13,000 feet and eventually to nearly 17,000 feet, where the direction was almost due East. This gave him speed enough to get to the coast before dark, landing near Hancock, Me., at 5 55 p.m. after a flight of 24½ hr. Hill, on the other hand, sailed very low the first night, literally just over the tree tops and in the morning found himself over western New York State. He was still getting more to the northward at the lower altitude, but the amount of "northing" that could be had was steadily diminishing, and he realized that the low pressure area was getting ahead of him, and if he didn't get some eastward speed in order to get ahead of the low again, he would end up by going south instead of north. Hence he immediately rose to an altitude of 12,000 to 15,000 feet and stayed there until he reached the New England coast. By this maneuver he got far enough ahead of the center of low pressure so that he again was able to get a route considerably northward at low elevations. As may be seen by the map he had a fine direction at the end and plenty of ballast to go through the night, but unfortunately tried to use his drag rope which caught in a tree, and he ran over his allotted fifteen minutes trying to get loose, landing in a dense fog at 11:00 p.m. eight miles west of Skowhegan, Me.

Captain Kepner Lagged Behind

Captain Kepner, winning third place, apparently lagged still farther behind, as he landed near the southern corner of Maine about midnight Tuesday night. Details of his trip are lacking, but he must have waited too long before going up high, and missed the chance of getting any further north at the end of the flight.

Another group of balloons, including veteran Honeywell, got too far to the north and had to land, mainly on account of storms, near the valley of the St. Lawrence River.

It must be understood that almost all of the high altitude flying was above the clouds out of sight of the ground. Van Orman carried a very good sextant which he had trained himself to use under just such conditions. Rasmussen in the DETROIT II, who landed in New Hampshire followed a very similar policy to Van Orman, except he went to altitude a little earlier in the race. He also carried a sextant but was not so experienced in its use, and when it indicated that he had been traveling at approximately 60 m.p.h. he did not believe it and came down below the clouds to get a definite check on his position. The amount of time and ballast lost in this maneuver undoubtedly lost him the race.

The majority of the contestants landed either directly or indirectly as a result of thunderstorms. For example, Williams in the balloon DETROIT I avoided the storms during the first night by going high very soon after the start, but he got too far south and used up his ballast next day in an effort to recover his "northing."

But alibis aren't much use in a balloon race. Almost anyone can afterwards figure out how he could have won. There is a saying that, a man may be down, but he is never out. That does not apply to a balloon race, however. There, when you are down, you are down and out. Too late then to make up for lost time. The opportunities of that race are gone never to return. The Gordon-Bennett Race from Denver, September 10, will show what American pilots can do, and we have a feeling that they will again lead the way.

The Official standing of the contestants is as follows:

Position	Entry	Pilot and Aide	Distance miles
1*	Goodyear T & R Co. Y Akron, Ohio	W. T. VanOrman W. W. Morton	718
2*	Detroit Flying Club No. 3 Detroit, Mich.	E. J. Hill A. G. Schlaaser	666
3*	U. S. Army Air Corps, S261 Scott Field, Ill.	Capt. W. E. Kepner Lt. W. O. Eareckson	595
4	Scripps-Howard Newspapers Ohio League	J. A. Beellner J. L. Cooper	562
5	Detroit Flying Club No. 2 Detroit, Mich.	S. A. U. Rasmussen W. A. Rikhoff	546
6	U. S. Army Air Corps S262 Scott Field, Ill.	Lt. J. A. Powell Maj. M. R. Smith	458
7	U. S. Army Air Corps, S265 Langley Field, Va.	Lt. Paul Everet Lt. R. B. Gillespie	413
8	U. S. Navy, S97 Lakehurst, N. J.	Lt. T. G. W. Settle Gen. W. Steelman	393
9	St. Louis Rotary Club St. Louis, Mo.	H. E. Honeywell R. H. Tait, Jr.	364
10	U. S. Army Air Corps S243 Norton Field, O.	Lt. Frank McKee Capt. S. T. Moore	362
11	Detroit Flying Club No. 1 Detroit, Mich.	C. D. Williams, Jr. G. M. LeGalles	352
12	"Dewey Tree" Expert Co. Kent, Ohio	R. P. Lehr C. H. Reib	346
13	Akron Beacon Journal Akron, Ohio	C. K. Willam Howard Wolf	315
14	U. S. Navy, S98 Lakehurst, N. J.	Lt. Chas. Beach Lt. F. R. Riecholdarfer	294
15	U. S. Navy, S5861 Lakehurst, N. J.	Lt. G. V. Wallin Franklin Masters	176

*Place winners on U. S. Team in International Gordon Bennett Race Denver, Colo. September 10, 1927

Vought Corsair Sets World's Speed Record

The World's Speed Record for seaplanes for a distance of 1000 kilometers has also been annexed by the Vought Corsair standard Naval observation plane.

This record was established on May 21st, by Lieutenant Rutledge Irvine, U.S.N., over the short closed course at Hampton Roads, Va. In covering the 1000 km., one hundred and nineteen turns had to be negotiated owing to the shortness of the circuit, which was only 25 km.

Lieutenant Irvine averaged 130.93 m.p.h. for the total distance, according to the National Aeronautic Association. This beats the former World's record by over 27 m.p.h., in spite of the fact that the Corsair's engine was permitted to turn only 1790 r.p.m.

Lieutenant Irvine flew the course in 4 hr. and 44 min., using a U. S. Navy stock model Corsair observation plane. This plane was designed around the new Pratt & Whitney Wasp, 400 hp. radial air-cooled engine. Carl Schory, of the National Aeronautic Association Contest Committee, was the official in charge of the record breaking flight.

This is the fourth World's Record to be established by Navy personnel in the past few weeks with this stock service Corsair plane. In the same plane, on April 14th, Lieut. George R. Henderson, U.S.N., made a World's altitude record of 22,178 ft. for seaplanes with 500 kg. ballast load. On April 23, Lieut. S. W. Callaway, U.S.N., made a world's speed record for seaplanes of 147.263 m.p.h. for 100 km. in the same class, and on April 30, Lieut. James D. Barner, U.S.N., established a world's seaplane speed record of 136.023 m.p.h. for 500 km., carrying 1102 lb. of ballast in addition to service useful load.

The establishment of this fourth record by the new Vought Corsair brings the number of World's records held by the United States to sixteen out of the fifty-nine records internationally recognized. The Vought Corsair, as a standard service seaplane, has the distinction of having made a world's record per week since it was assigned to record breaking, and it is expected that several more world's records are easily within the capabilities of this phenomenal service plane. Of the six world's records recently returned to the United States, four have been consecutively made by this latest Vought model which is to replace the UOs in the Naval Air Service.

St. Louis–Wichita and Denver Air Centers

By EARL D. OSBORN

THE NATIONAL Air Races of 1923 which took place, at the then newly opened Lambert-St. Louis flying field, were probably the most successful races ever held and since that time the field has lived up to the precedent established. The Robertson brothers, Frank and William, have been the mainstay of the activities which have made the airport one of the foremost centers of commercial activities in the mid-west.

The Robertsons were in the Air Service during the War, and shortly after the Armistice they began their aerial service operations. From small beginnings they have developed a very substantial business. In April 1919, they started a school and have since trained large numbers of students. Main emphasis has been put on the actual flying instruction, but as the airport is a very active one with well equipped repair shops, the students have ample opportunity of learning this branch of the business. Along with the school, the Robertsons have developed the usual taxi service, photographic flights, etc. Another important part of their business has been the selling of aeronautical materials, planes and motors. They have always kept on hand large stocks for retail distribution and in cooperation with Nicholas-Beazley Airplane Co., have specialized in Standards. These are shipped from warehouses in Texas, and completely rebuilt and inspected at the Robertson shops.

Looks Like Flier's Paradise

Last year, the Robertson Aircraft Corp. obtained a contract for carrying air mail between Chicago and St. Louis. Operations started on April 16, 1926, with fourteen DH's purchased from the Government Air Mail. Some of these planes were practically new while others had seen service. The line makes connections with the New York-Chicago night Air Mail. Letters to and from New York save a day in transit, and quite a volume of mail has been carried. The route is 278 mi. long and stops are made at Peoria and Springfield. During the Winter months part of the run each way must be made in the dark and the lighting facilities have recently been completed.

To anyone coming from the East, the mid-West looks like a flier's paradise and until one reaches the Rockies the further West one goes the better it looks. There are thousands of miles of country as flat as a billiard table, few trees or telegraph lines and countless large fields.

In the heart of this country lies Wichita, Kansas, a pleasant and prosperous town. The place is small enough so that the building of airplanes could become a considerable part of its industry and thus interest its leading citizens and yet large enough to supply a sufficient number of skilled workmen. Situated as it is in an ideal flying country, where distances are great and railroad transportation poor, it is easy to show the average practical citizen the advantages of aviation and get him to become air-minded. It is, therefore, logical that Wichita will continue to hold the position which it has already established in the aircraft industry.

Occupies Two Shops

The Travel Air Co. at present occupies two shops in Wichita. One is for the building of the steel fuselages and the other for woodwork and fabricating wings. The final assembly is done at the company's flying field which is situated on the outskirts of the town. Within a month, however, the company will have moved into a model factory which is in process of construction at the flying field. The new factory will give the Travel Air one of the finest plants in the country devoted entirely to the manufacture of civilian planes. At present the Travel Air is concentrating on the manufacture of the new monoplane powered with a Wright Whirlwind engine. Eight of these have been ordered for early delivery by the National Air Transport for use on the Chicago-Dallas route, and the shops of the Travel Air company are extremely busy meeting the delivery dates. The monoplane was designed especially for flying in foggy weather and at night, and it is so well balanced that it will fly long distances 'hands off'. The Travel Air has always gone on the theory that quality counted and that there was a field for planes with the best of workmanship even though the price was higher. The new planes show how thoroughly the mechanics in the shop have grasped the idea, for the workmanship is excellent.

Clouds of Dust Hide Airdrome

The Swallow Airplane Co., has a shop and hangars on its flying field, located a short distance from Wichita. The facilities are sufficient for the construction each week of two or three of the three place type of plane in which the company has always specialized. At the time of the writer's visit the company was undergoing a reorganization which would provide adequate working capital and allow of a steady production. Mr. Hattensdtorf, an experienced factory manager from Michigan, has joined the company and it is to be expected that under the new plan of management that the company will make rapid progress.

A flight from Wichita to Denver was made in a specially chartered Travel Air biplane fitted with a Hisso engine, and piloted by Johnnie Green, field manager for the Travel Air. The distance was over five hundred miles and took five and one-half hours, including two stops, one for gasoline and one at a farm house to make certain that we were on the right course. Green had never made the trip before. The country is so flat and sparsely settled that it takes real navigating ability to find one's way, and an unskilled pilot is apt to find himself several hundred miles from where he expects to be if not cautious. About halfway, dust began to rise from the prairie and soon we were enveloped in such thick clouds of dust that at times the ground could scarcely be seen. Due to good piloting, a maneuverable fast plane, and the level ground, the air did not seem especially rough and a good landing was made at Denver in a 45 m.p.h. wind, but five minutes later when the mail plane from Cheyenne arrived, the field was so clouded in dust that the pilot could not see it and flew on to the Eaglerock field.

Splendid Progress Made

The Alexander Industries has made aeronautical history. It was only a little over a year ago that the Eaglerock was first announced, yet during this brief time the plane has established itself as one of the leaders in the three place type of plane. During the last year, a large number of planes have been sold, a nation-wide dealer system has been built up and the reputation of the company has been established throughout the country.

The aircraft industry has been astonished at the rapid progress made by this company but the explanation is really simple. The management of the company has not only been capable but those responsible have become active fliers and know what the real problems are. The company is adequately

financed but perhaps the most important element is the use of sound business methods and modern aggressive salesmanship in the merchandising of their product. The Alexander Industries has put a tremendous amount of energy into the sale of their planes and into the development and follow up of their dealer organization and the result has been amazing.

The Alexander Industries has always specialized in selling and the medium used has been motion pictures. Short stories are filmed showing the advantages of thrift. The titles carry the name of the local bank and a series of films are shown in the theatres. The business is of a specialized type and has been developed by the Alexander Industries in complete realization of the advantages to an airport of running a series of reels throughout the year at the local theatres showing what can be done with airplanes, and of having the field's name mentioned into each story. The merchandising experience, gained through the years of this kind of work, has been applied by the Alexanders to the selling of airplanes.

New Shops Being Opened

The Englerock was at first built in the same buildings which housed the motion picture studios but recently a separate building has been constructed which furnishes excellent facilities for the construction of the planes. A considerable amount of new woodworking machinery has been purchased and fairly elaborate jigs have been made for the metal fuselage construction. At the time of the writer's visit, the new parts of the shop were being opened and there was every evidence that progress was being made, not only in the facilities available, but in the organization of the processes of manufacture.

The factory is located on the outskirts of Denver, a mile or two from the flying field. All planes are taken to the airport, assembled and test flown. The planes which are to be shipped by freight are then dismantled and crated for shipment.

Doolittle's Stunting Features Air Meet

Lieut. James R. Doolittle of the Army Air Corps gave a thrilling exhibition of stunt flying at the American Legion air meet held at Curtiss Field, L. I., June 12. A few weeks ago Lieutenant Doolittle, flying the ship he used at the Legion meet, a Curtiss pursuit plane, made an outside loop for the first time in the history of aviation. While he did not attempt that particular stunt, which aviators had called impossible until Doolittle did it, he did about everything else that his plane could stand.

A long program included racing by stock planes, formation flying and stunts by six of the famous Selfridge Field group of pursuit ships and parachute jumping.

There were three races of three laps, each over a triangular course, marked by the water towers at Mitchel Field, Westbury and the Curtiss plant in Garden City. In the first race flying at a speed of 140 m p h. William Parker piloted a stock model Travel Air biplane, equipped with the 200 hp Wright Whirlwind motor to a first place. George Weiss, flying another Travel Air with the same motor was second, and Richard Pears in a Fairchild monoplane was third. The Fairchild also has the Wright motor but is a heavier machine.

In the second race, which was confined to planes with ninety horsepower engines, Russell Schults flew an Englerock to a first place. Second place went to one of the "Sikorsky Jennies", flown by Russell Hosler. This particular plane has excited comment because it is an experiment recently carried out by the Sikorsky Company. The company purchased several old JN fuselages and fitted them with monoplane wings designed by Igor Sikorsky. This particular plane was tested recently for the first time by Henry White, sales manager for the Sikorsky Company. In the race Hosler made 100 m p h, beating two fleet Waco biplanes, but trailing the Englerock by a half mile.

Five JNs piloted by National Guard officers from Miller Field competed in the next race. They were closely matched but on the last lap around the towers Lieutenant Kenneth Noble banked sharply and came in ahead.

In a match race Casey Jones, Curtiss test pilot, was the matchmaker. A tri-motored Fokker similar to Commander Byrd's America which had been carrying passengers during the meet, and the two-motored S-29, formerly known as the Yorktown, the huge Sikorsky air liner, were the rivals. The Fokker won easily over its heavier rival.

The last event of the day was a parachute jump by Jean Broadridge, who leaped at 2,000 ft. from the cockpit of a Curtiss Standard and landed on Roosevelt Field.

Ryan Planes for Alaskan Service

According to a statement printed in the Yukon, Alaska, "Whitehorse Star"—the Yukon Airways and Exploration Co. Ltd., has just been incorporated as a private company with a capital of $50,000. The head office of the company will be at Whitehorse. James F. Finnegan, of Wernecke, is president, Clyde G. Wann, of Keno, vice-president; Andrew D. Cruikshank, of Whitehorse, general manager; and C. A. K. Innes-Taylor, of Whitehorse, advisory director.

This company, with base at Whitehorse, will serve all parts of Yukon, and particularly those parts which are without transportation facilities.

The new enterprise, it is stated, is backed principally by mining men, the object in view being to help open up Yukon by making it more accessible to the prospector and mining engineer.

For the time being no regular schedule will be attempted but the necessary arrangements are being made to handle expeditiously all business offering. With the opening of the winter season it is anticipated that a schedule service will be started with a view to serving Mayo, Keno, Dawson, Engineer and Atlin.

Passenger and freight service, special contracts, prospecting and exploration work of all kinds, will form the chief activities of the new company, and in this connection the amount of business already in prospect is most encouraging.

The planes to be used are being built by the Ryan Airlines, Inc., of San Diego, California. They are monoplanes equipped with interchangeable landing gear, wheels, pontoons or skis. They are engined with the Wright Whirlwind J-5C.

Mr. Cruikshank, who is an experienced flier and aeronautical engineer, has recently successfully passed the necessary tests at the Royal Canadian Air Force Station at Vancouver, for which he has been granted a commercial license. He is now at San Diego making a careful inspection of the plane now under construction, which he will fly north. The machine will be shipped from San Diego to Carcross and assembled and tested there.

President Issues First Air Regulation

On June 9 President Coolidge issued the first executive order under the section of the Air Commerce Act of 1926 which permits the Federal Government to limit the use of the air.

The order follows in full text:

Under the provisions of Section 4 of the Air Commerce Act of 1926, the following regulations are promulgated to provide for the public safety in the District of Columbia upon the occasion of the visit of Colonel Charles Lindbergh to the City of Washington, June 11-12.

Between the hours of 11 a.m., June 11, and 6 p.m., June 12, the air space above that portion of the District of Columbia west of the Anacostia River and north of the Potomac River shall not be used for flying purposes, except for Government aircraft for which specific authority has been granted.

Rules of the 1927 National Air Races

Rules governing the 1927 national air races from New York City to Spokane, Wash., were announced in Spokane June 4 by the National Air Race Association. The route is approximately 3300 mi and at the conclusion of the cross-country events the national air races will be staged. The race will start September 20.

Commercial airplanes only may compete in the New York to Spokane race and the San Francisco to Spokane contest but classes for all types of craft are provided in the racing competition for national cups and trophies for military men and cash money for commercial fliers.

The total prize money exceeds $43,000 and more than $60,000 has been raised by Spokane business men to finance the events.

Parkwater field, Spokane's municipal airport, will be the scene of the finish of the air race and of the holding of the air races. It is a half mile wide and a mile long, perfectly level and well drained.

Entries may be made now at any time and applications should be made to Major John T. Fancher, National Air Race Association, Spokane, Wash.

Five Cash Prizes

There will be five cash prizes—First prize, $10,000; Second prize, $5,000; Third prize, $2,000; Fourth prize, $1,000; Fifth prize, $500, and in addition to the cash prizes there will be awarded a silver trophy to the first enclosed cabin cruiser to arrive in Spokane.

The types of planes eligible are open or enclosed standard stock models primarily designed for commercial passenger service as defined in paragraph 6, with a seating capacity in cabins or cockpits of at least two passengers beside the pilot.

An engine displacement greater than 510 cu. in. up to and including, but not exceeding, 800 cu. in. will be required.

All airplanes must carry a load of 320 lb., in addition to the pilot. This load to consist of two passengers or ballast in the passenger cockpit or compartment.

The race from New York to Spokane is to start at Roosevelt field, L. I., N. Y., Tuesday morning, Sept. 20, at 5:30 a.m., eastern standard time. All planes to start from at rest position with engines running. Planes may be started in groups of ten, the first ten entries selected by lot making up the first group, the second ten entries selected by lot making up the second signal immediately after the runway is clear.

The first leg of the journey will be to Chicago, flying over the established air mail route between New York and Chicago. Chicago will be the first control station, and all planes will be required to land and stop for not less than five minutes.

St. Paul, Minn., will be the western terminus for the first day's flying.

Planes to be Handicapped

All planes will be started from St. Paul, Minn., Wednesday morning, Sept. 21, in the order of their arrival, the first plane to depart at 5:30 a.m., the second plane the same number of minutes after 5:30 a.m. as it landed after the first plane, and other planes will be handicapped the number of minutes that they followed the preceding plane.

The first leg from St. Paul, Minn., west will be to Fargo, N. D., where all planes will land for not less than five minutes.

The next leg will be from Fargo to Glendive, Mont., where all planes will be required to land for not less than five minutes.

The next leg will be from Glendive to Butte, Mont., where they will be required to land for not less than five minutes, and the fourth leg will be from Butte to Spokane.

In addition to the control stations listed above, there will be intermediate fields at the following cities between Chicago and Spokane: La Crosse, Wis., Bismarck, N. D., Billings and Missoula, Mont. The official air mail fields will be the intermediate fields east of Chicago.

Oil and gasoline will be available at all control stations and intermediate fields during the contest. Each pilot will be required to assume the responsibility of refueling his own plane.

In addition to the qualifications hereinbefore stated, each plane entered must be eligible under the following regulations:

(a). Every airplane entered must be of a type of which the first example was tested in flight prior to July 15, 1927.

(b). Airplanes of types of which four shall have been built in form suitable for commercial service prior to July 15, shall be considered as stock models, and shall be eligible for entry. Other airplanes complying with (a) but not with (b) may be admitted at the discretion of the contest committee, if in the judgment of that committee there is satisfactory evidence that the type was originally produced with the expectation of offering it for general sale, or putting it into regular commercial service.

Every entrant in this contest will be required to file with his application for entry a sworn statement by an official of the company who manufactures the plane he desires to enter that his plane is, in every respect, a standard stock model, and that it is eligible to entry under the rules and regulations of this contest.

At the time of entry the entrant must also supply the contest committee with a statement giving the bore, stroke and cubic inch displacement of the engine to be used in this race, and the horsepower rating as established by the manufacturer of the engine, this statement to be properly executed before a notary public. The contest committee reserves the right to check the measurements and moving parts of the engine entered, and to demand the removal of any of the parts for this purpose. The decision of the contest committee as to the eligibility of any plane and engine entered shall be final.

No protest shall be considered unless presented in writing to the contest committee within twenty-four hours after the finish of the race. (F.A.I. rules, 78, 79, and 80.)

The entry fee $50, payable at time of entry. No entries will be accepted subsequent to Sept. 10, unless written consent is first obtained from other entrants by the individual making application. Pilots will meet for referee's instructions at the contest committee headquarters at Roosevelt field at 9 a.m. Monday, Sept. 19. This race is to start at the hour and on the date specified unless, in the opinion of the official starters, the weather conditions are so unfavorable that it would be unwise for the contestants to start.

Entry blanks and additional information may be secured from Major John T. Fancher, managing director, National Air Race Association, Spokane, Wash.

Rules for class B planes are similar to those for class A as far as the start, route and general regulations are concerned. However, prizes, the stops and types of planes eligible are different. The entry fee for class B planes is $25. Cash prizes are: First, $5000; second, $3000; third, $1000; fourth, $500; fifth, $250.

The following is an outline of the important parts of the class B rules: Open or enclosed standard stock models, primarily designed for commercial passenger service, with a seating capacity in cabins or cockpits of at least one passenger besides the pilot are eligible.

The engine horsepower is up to and including, but not exceeding, engines of 100 horsepower.

All planes arriving at Spokane airport after 5 p.m. (Pacific coast time) Thursday, September 22 shall not be eligible for prize awards.

Rules for the Detroit Balloon Handicap

A trophy valued at $1,000.00 has been put up by the Detroit News for annual competition between balloons of variable size. The first race two years ago for this trophy was won by S. A. U. Rasmussen, of Detroit. Last year J. A. Boettner, of Akron, won the award although practically tied with Rasmussen. As any individual or organization must win the trophy

three times in succession for permanent possession, the trophy is open to competition again this year. The race is for distance, the balloons being handicapped by the stipulation of a minimum crew in proper proportion to size.

Information and Rules Applying to the 1927 Race

Date and Time

Monday, July 4, 1927—at 5 00 P.M.

Place

Ford Airport, Dearborn, Michigan.

Gas

Coal gas of specific gravity not greater than 0.44. Lift, for average summer conditions, about 45 pounds per 1,000 cu. ft.

Size of Balloons

Any balloon up to and including the 5th category, F.A.I. may be entered.

Crews

The schedule of balloon sizes, with the required minimum crew, including pilot, is as follows:

Up to and including 35,000 cu. ft.	1 man
35,000 to 45,000 cu. ft.	2 men
45,000 to 55,000 cu. ft.	3 men
55,000 to 65,000 cu. ft.	4 men
65,000 to 77,600 cu. ft.	5 men

The above volumes are subject to the usual tolerance of 5%.

Entries

Entries may be made at any time up to three days previous to the race, but the management reserves the right to decline any entries in excess of six. Contestants are asked and advised to make entries on or before June 15, 1927.

An entry fee of twenty-five ($25 00) dollars shall accompany each application. The latter may be made by either organization or individual. If by organization the pilot shall be designated at least three days previous to date of race and an earlier designation is earnestly requested.

Cash Prizes and Expense Allowances.

1st prize — $500 00 plus one half of forfeits and fines
2nd " — 400 00 plus one-third of forfeits and fines
3rd " — 300 00 plus one-sixth of forfeits and fines
4th " — 200 00
5th " — 100 00

An expense fund totalling $500 00 will be divided equally among all contestants who have their balloons inflated ready to go. The entry fee will also be returned at the same time.

General Conditions

The winners will be decided by the great circle distance from starting to landing points, in the manner provided by the F.A.I. The race will be subject to all the F.A.I. requirements which pertain to this type of contest, except as otherwise herein provided.

In the case where contestant wishes to try for a new record, the special F.A.I. regulations governing the matter will apply. Contestants are asked to give notice at least three days in advance of the start, as to whether they wish to try for a record of any kind.

The start may be postponed if, after conferring with the pilots, in the judgment of the officials in charge, it appears desirable from a standpoint of safety.

Pilots are officially requested not to try to fly through a thunderstorm unless caught in one while over the water.

Equipment

Each contestant is expected to furnish his own ground equipment of the usual kind.

Suitable life saving equipment is advised, either in the form of basket floats or separate pneumatic boats.

All equipment required for inflation should be at the field at least two days before the race, where facilities will be provided by the management for safe keeping.

A field guard will be provided in case any contestants wish to lay out the night before the race.

Gas will be turned on not before 9 00 A.M. or after 10 00 A.M. the day of the race.

Place on the field will be assigned by the Committee in charge, the preferred locations being designated in accordance with priority of entries.

The above rules are subject to the approval and sanction of the Contest Committee, N.A.A.

Licensed Dept. of Commerce Pilots

First list of American pilots licensed to operate aircraft by the Department of Commerce is as follows:

NAME	ADDRESS	LICENSE NO	CLASS
MacCracken, Wm., P Jr.	Dept of Commerce Aeronautics Branch, Washington, D C	1	Private
Young, Clarence M	Dept. of Commerce, Aeronautics Branch, Washington, D C.	2	Private
Lockwood, Ralph G.	Dept of Commerce, Aeronautics Branch, Washington, D C	3	Transport
Cramer, Parker D	Dept of Commerce, Aeronautics Branch, Washington, D C.	4	Transport
Jardone, Frank H.	Dept. of Commerce, Aeronautics Branch, Washington, D C.	5	Transport
Jones, W B.	Dept of Commerce, Aeronautics Branch, Washington D C.	6	Transport
Cast, Robert M	Dept. of Commerce, Aeronautics Branch, Washington, D C	7	Transport
Lees, R	Dept of Commerce, Aeronautics Branch, Washington, D C	9	Transport
Parkin, W F	Dept of Commerce, Aeronautics Branch, Washington, D C	10	Transport
Jones, C S.	Curtiss A. & M Co., Garden City, Long Island N Y	13	Transport
Sommers, James D	Dept of Commerce, Aeronautics Branch, Washington, D C	20	Transport
McClellan, Stephen A	522 18th St., N W., Washington, D C	21	Transport
Tower, Leslie R.	c/o Bolling Airplane Co Seattle Wash.	30	Transport
Collyer, Charles D D	Skywriting Corp. of America 50 East 42nd Street, New York, N Y	58	Transport
Love Philip R	Anglum Missouri	64	Transport
Lindbergh Charles A.	% Robertson Aircraft Corp., Anglum, Missouri	68	Transport
Brayton Clyde E	Anglum Missouri	71	Transport
Yonge Lonnie	220 West Adams Street, Jacksonville, Fla	77	Transport
Merrill, M. M	% Curtiss Flying Service, Inc. Garden City Long Island New York	78	Transport
Boyd Paul M	% Curtiss Airplane & Motor Co., Garden City, Long Island N Y	80	Transport
McMullen, William H	Curtiss Flying Service, Garden City, N Y	81	Transport
Maxim, George W	Curtiss Place Long Island N Y	84	Transport
Wilson, Paul D	402 So. Aurora Street, Ithaca, N Y.	87	Transport
Esslinger Reinhold L	Hicksville, L. I., N Y.	123	Transport
Dunn Frank T	4155 Lindell Boulevard, St Louis Mo.	151	Transport
Laughlin, Herschel V	86 N 18th Street Portland, Ore	158	Transport
Merrill Russell H	Anchorage, Alaska	169	Transport
Kerr, Adolph P.	Pitcairn Aviation, Inc, Willow Grove, Pa.	173	Transport Pilot
Christopher Lake	Keystone Aircraft Corp., Bristol, Pa	175	Transport Pilot
Crawford Howard	Kunkle Ohio	228	Private
Parks, Oliver L.	7027 Waterman, St Louis, Mo.	243	Transport
Dempsey Elmer A.	1127 Cass Avenue, St. Louis, Mo	244	Transport
Garney Herlan A	Anglum, Missouri	245	Transport
Dunlap Wm G	917 East 18th Street, Winston Salem, N C	246	Transport

Air Mail to Foreign Countries

Rates for Letters Which Are To Use European Air Lines

THE POST OFFICE DEPARTMENT has issued two bulletins which give instructions and rates for the use of the Air Mail in connection with foreign mail. The first which went into effect Jan 7, 1921, follows.

Effective February 1, 1927, the postage on letters or articles sent to britrrs from the United States to foreign countries, and intended for transmission by the United States airmail service, irrespective of routes rr distances traveled, will be as follows

When destined for countries to which the United States domestic rate applies, the airplane postage only (10 cents for each half ounce or fraction thereof) but when destined for any other country, the airplane postage plus the international letter rate of 5 cents for the first ounce or fraction thereof and 3 cents for each additional ounce or fraction thereof, less the domestic rate of 2 cents per runce rr fraction thereof For example, the entire postage, including the air-mail fee on a letter for Great Britain will be 10 cents for each half ounce or fraction thereof, and on a letter to France will be as follows 13 cents for one-half ounce or fraction thereof 23 cents for more than one-half ounce and not exceeding 1 ounce 34 cents for more than 1 ounce and not exceeding 1½ ounces, 44 cents for more than 1½ ounces and not exceeding 2 ounces etc.

Postmasters will please cause due notice of the foregoing to be taken at their offices and the widest publicity, without expense to the department, to be given thereto

The second bulletin issued on May 6, 1927, gives the rates required for the use of European Air Mail services. It follows:

This department has been advised by the postal administration of Great Britain that the air mail service on certain routes which was suspended during the winter has been reopened

It is therefore necessary to restate the air mail service mentioned in the notice of this office dated October 20 1926 and printed on page 11 of the Postal Guide for November, 1926 as follows:

"A Leave London daily except Sunday at 6 a m for France and Switzerland, offering delivery in Paris and Bale the same afternoon and in Zurich, the same evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word Express.' The service on this route is liable to suspension during the winter

"B Leave London daily except Sunday at 11 a m for France, offering delivery at Paris the same evening

"C Leave London daily except Saturday and Sunday at 2 45 p m for Germany, Czechoslovakia, Austria Hungary, Yugoslavia, and Roumania, offering delivery at Nuremberg Germany the next morning at Prague and Vienna the next afternoon at Budapest the next evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word Express and delivery at Belgrade and Bucharest the next day but one. Service on this route is liable to suspension during the winter

"D Leave London daily except Sunday at 6 a. m for Belgium and Germany, offering delivery at Brussels and Antwerp the same afternoon or evening Cologne same afternoon at Frankfort on the Main the same afternoon and at Munich the same evening If an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word Express'

"E Leave London daily except Sunday at 8 a. m. for the Netherlands, offering delivery at Amsterdam and Rotterdam the same afternoon

"F Leave London daily except Sunday at 6 a. m for Germany, Denmark, and Sweden offering delivery at Hamburg Copenhagen and Malmo the same evening If an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word 'Express The part of this route beyond Hamburg is liable to suspension during the winter

"G Leave London daily except Sunday at 6 a m and at 12 noon on Saturdays for Germany and Danzig offering delivery at Hanover and Berlin the same afternoon or evening if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word Express and delivery at Danzig and Konigsberg Germany on the next morning

"H Leave London daily except Sunday at 6 a. m for Lithuania and the Union of Socialistic Soviet Republics (Russia) offering delivery at Kovno Lithuania the next day and at Smolensk and Moscow on the next day or next day but one This route is liable to suspension during the winter

"I Leave London daily except Sunday at 6 a. m and 6 p. m for Morocco and western Algeria offering delivery at Tangier and Casablanca on the evening of the second day after dispatch and at Oran on the evening of the second or morning of the third day from London

"J Leave London each Wednesday at 6 p. m. and each Thursday at 8 a m for Senegal offering delivery at Dakar, Senegal in four days from the time of the Wednesday dispatch

"The air mail postage required in addition to the international letter rate of postage is as follows:

"On letters to France Belgium and The Netherlands 4 cents for each ounce or fraction thereof; to Switzerland Germany Danzig Austria Hungary, Czechoslovakia, Sweden and Denmark, 6 cents for each ounce or fraction thereof; to Yugoslavia and Rumania, 8 cents for each ounce or fraction thereof; to Lithuania 12 cents for each ounce or fraction or fraction thereof to the Union of Socialistic Soviet Republics, 18 cents for each thereof to the Union of Socialistic Soviet Republics, 18 cents for each ounce or fraction thereof; to Morocco and western Algeria 7 cents for each ounce or fraction thereof; and to Senegal (Dakar), 24 cents for each ounce or fraction thereof. *The air mail fee and the postage to be prepaid by postage stamps affixed to such pieces.*

Mail matter intended for dispatch by the above mentioned air mail service should be prominently marked in the upper left-hand corner of the envelope or cover with the words Air Mail—London to Continent, so that the articles in asserting may not be overlooked.

Articles for Morocco and western Algeria should in addition be plainly marked immediately below the above mentioned marking with the indication 'Par avion de Toulouse (by airship from Toulouse), and articles for Dakar should be marked in the same place as the cover with the indication 'Par avion de Toulouse a Dakar' (by airship from Toulouse to Dakar)

All mail articles for this service will be dispatched to New York for onward transmission from that exchange post office.

Postmasters will please cause due notice of the foregoing to be taken at their offices and the widest publicity, without expense to the department, to be given thereto

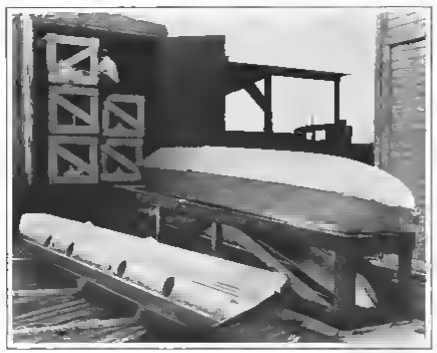
Post Office Sells Planes

An old-fashioned auction was held in the office of Second Assistant Postmaster General Glover at 12 o'clock, noon, (E S T.), June 16.

Twenty-nine Douglas air mail planes, recently acquired by the Post Office Department were sold. The planes were all fitted with air mail equipment, including night flying appliances.

On July 1 the Post Office Department will relinquish operation of the western section of the trans-continental route, Chicago to San Francisco, to the Boeing Airplane Company of Seattle. On Aug. 1 the eastern section, New York to Chicago, including the overnight service to those cities, will be taken over by the National Air Transport, Inc.

Of twenty-one remaining Douglas mail planes fifteen will be turned over to the War Department, at least one to the National Advisory Committee for Aeronautics and five to the Department of Commerce for use in connection with the establishment and maintenance of lighted airways throughout the country. Some of the planes allotted to the War Department will be placed on Summer fire patrol in the forestry service. About twenty-eight De Havillands remaining in the air mail service will be assigned to other government departments



Leading first car of metal postcons ever shipped. For the Canadian Hudson Straits Expedition Camp Bordoe, Canada, for use to convert Fokker Universals into seaplanes. The pontoons, of duralumin were constructed by the Hamilton Aero Manufacturing Co. and shipped at Milwaukee from their private side track.

Lindbergh's Wright Whirlwind a Result of Seven Year's Development

(*Cont from page* 1359)

ilar way the Models J-5C and J-5CA indicate minor modifications of the basic model J 5 design.

Three fifty-hour endurance tests have been run on the J-5 engine, in addition to approximately 100 hours of miscellaneous calibration and fuel consumption tests. The first fifty hour endurance test was run at 1971 r.p.m. at full throttle, giving an average mean effective pressure of 121 lb. per sq in The average power developed during this test was 238 hp. and the fuel consumption was .508 lb /hp./hr. The second fifty-hour endurance test was run at 1827 r.p.m. at full throttle and showed an average power of 216 hp., with a fuel consumption averaging 458 lb /hp /hr. and a mean effective pressure of 119 lb. per sq in. The third fifty-hour endurance test was made in an effort to determine the overload durability of the engine To this end an external supercharger was provided, arranged so as to force air to the carburetor No other change was made in the engine itself In spite of the fact that this test was conducted during the hottest part of the Summer with an air temperature averaging 150°F., at the point of entrance to the carburetor, the engine ran fifty hours without difficulty, averaging 295 hp. at 2150 r.p.m., and with a fuel consumption of 510 lb /hp /hr While this remarkable test has no immediate practical value to commercial aeronautics, it does indicate the extreme durability and strength built into the engine

Suited to Commercial Service

The improvements incorporated in the Model J-5 series make this engine peculiarly well suited to commercial service, where profits are dependent on continued successful operation without forced landings, and where the operating expense is affected by low fuel consumption and a minimum amount of labor in engine maintenance and in overhaul. With the enclosed valve gear of increased area, it is claimed that the valve clearances will not require readjustment for periods of from twenty-five to fifty hours, and that the rocker arm bearings will need lubrication only each fifteen hours. This feature alone results in a large decrease in maintenance costs, since all engines with exposed valve gear require complete readjustment and lubrication of the valve gear approximately each five hours. With the valve gear properly adjusted and set, this maintenance expense is eliminated except for infrequent periods.

"Franne D'Arc," Plane being used in search for Nungesser and Coli

Texas Pair Build OX5 Powered Monoplane

George W Williams and George Carroll, both of Temple, Tex., have designed and built an OX-5 powered monoplane Both the workmanship and the performance speak very well for their efforts. While no official tests have been made, the performance is exceptional for an OX-5 engined plane. It has a quick take off, a good climb, and will land at about 35 m.p.h with a high speed of 90 m.p.h A load of 300 lb has been carried besides a 160 lb. pilot and 28 gal. of gasoline The controllability and vision are very good It is claimed that it can be flown with a full load with the engine throttled to 1000 r.p.m without losing altitude

Left, George Carroll, right, George Williams

This is the second monoplane built by Mr. Williams and Mr. Carroll. The first having been powered with an 80 h.p. Le Rhone and later with a 120 h.p. Le Rhone. It was their intention to build the planes for their own use but those thus far produced have attracted such favorable comment both as to performance and workmanship that it has been decided to build a limited number commercially. Work has already been started on a steel tube fuselage demonstration job, with a detachable motor mount so that the plane can be equipped with any motor which might be desired This model will be tested with both Hispano and Wright Whirlwind engines, giving the purchaser a wide range of engines to select from since the plane shows excellent performance with an 80 h.p. engine, while at the same time it is sturdy enough to take care of the 200 h.p Whirlwind

Aviation Weather Report System Planned

Preparations for furnishing weather information and communication service to pilots on the Transcontinental route, which is now used primarily by air mail pilots of the Post Office Department, are being made by the Department of Commerce. After July 1, the maintenance of this route will be turned over to the Department of Commerce and it will be used both by private contract air mail operators and by any other pilots desiring to avail themselves of the services offered.

When on July 1, the Post Office Department relinquishes this 2,665 mile airway and also the Chicago-New York night route, the Department of Commerce will have taken over the maintenance of these routes and the furnishing of all aids to flying, including weather information and complete communication service from New York to San Francisco This work will be done by the Airways Division of the Lighthouse Bureau, under the direction of William P. MacCracken, Asst. Secretary of Commerce for Aeronautics.

Mr. Thomas Chapman, meteorologist of the Airways Division, is at present traveling over the Transcontinental route collecting information on the methods now used by the Post Office Department in cooperation with the Weather Bureau The Weather Bureau will continue to furnish forecasts after July 1, when the National Air Transport, Inc., will begin flying from Chicago to New York, and the Boeing Airplane Company will commence operation between San Francisco and Chicago.

United States to Europe and Return

Cont. from page 1355

tion Service in London with two gold keys and an illuminated inscription congratulating him on his New York-to-Paris achievement.

Friday June 3

After a two hour fog delay, takes off Kenley Airdrome and follows Handley-Page passenger plane across the Channel and arrives safely at Le Bourget. Visits the Paris Post of the American Legion and is made an honorary member. Attends small informal dinner party at the American Embassy.

Saturday June 4

Flies from Le Bourget field to the airdrome at Lessay and motors to Cherbourg where he is received by the mayor. Is taken by motor launch to the cruiser Memphis, amid the cheers of the townspeople and the screaming of boat whistles, to begin his return journey across the Atlantic.

Sunday June 5 to Friday June 10

At sea. Inspects ships mechanicism and sea planes on the catapaults, dines with ship's officers and crew, and rests up for his welcome receptions in the United States.

Saturday June 11

Receives national gun salute as the cruiser makes its way up the Potomac to the Washington Navy Yard where it docks at noon. Is greeted by mother in the seclusion of the captain's cabin on the Memphis, and then is escorted to the Washington Monument where he is presented to President Coolidge who decorates him with the first Distinguished Flying Cross. Also receives from the president his commission as a Colonel in the Officers' Reserve Corps. Delivers European message of good-will. Is driven in the president's car to the

Being decorated by President Coolidge

temporary White House in Du Pont Circle as the honored guest of the nation. Dines with the Cabinet, attends party given by the Minnesota State Society, and the National Press Club reception held in the Washington Auditorium.

Sunday June 12

Attends church with his mother and President Coolidge. Lays wreath on tomb of unknown soldier. Calls on the World War veterans at the Walter Reed Hospital. Visits the "Spirit of St. Louis" at Bolling Field and inspects the latest type of pursuit plane housed at the field. Attends vesper services commemorating the adoption of the American flag and receives from Charles Evans Hughes the Cross of Honor of the United States Flag Association.

The triumphal parade up Broadway

Monday June 13

Is unable to fly to New York in the "Spirit of St. Louis" due to engine trouble, so makes the trip to Mitchel Field in an Army pursuit plane with escort. Is carried in an amphibian plane to the Narrows in New York Harbor. Triumphal parade up Broadway and Fifth Ave. to Central Park, stopping at City Hall to be decorated by the Mayor, and at the Eternal Light to place tribute of roses. Is decorated by Governor Smith with the New York State Medal of Valor and reviews troops, then departs with mother for social affair on Long Island. Day's reception greatest in history.

Annual Cheney Award For Act Of Valor

An award, consisting of a suitably engraved plaque and a sum in cash, to be known as the Cheney Award, is to be made annually to members of the U. S. Army Air Corps Reserve, for an act of valor or of extreme fortitude or self-sacrifice in a humanitarian interest, made in connection with aircraft. The act need not necessarily be of a military nature.

This gift has been made by the mother and sister of Lieut. William H. Cheney, who lost his life in the World War, and will be made on Jan. 20, commemorating the day on which he died.

The recipients of the award will be determined annually by a permanent board of officers of the Office, Chief of Air Corps, at Washington, D. C., consisting of the executive officer, the chief of the training and operations division and the chief of the information division. This board will meet on the first day of January of each year, or as soon thereafter as possible, to determine the recipients of the award for the preceding calendar year.

A die of suitable design has been made and bronze plaques will be struck off each year the award is made, engraved with the name of the recipient or recipients, as determined by the Cheney Award Board. Accompanying the presentation of this annual gift will be a Certificate of Award setting forth the general purpose of the award.

The Pioneer Earth Inductor Compass

(Cont. from page 1357)

ductor Compass all are eliminated or rendered insignificant.

The first error resulting from lack of horizontality is overcome by the stabilizing of the earth inductor generator. Since there is no pivotal suspension, no inertia (in the magnetic-responsive element) and no liquid to cause trouble by its viscosity, the generator is not affected by any movements of the craft except turning, which it is designed to discover and indicate. For the same reason vibrations, the third source of error, are without effect, there being no delicate moving part in which rotation may be induced.

Affected by Local Magnetism

The earth inductor generator is affected by local magnetism in just the same way a magnetic compass would be affected in the same location, since such magnetism distorts the earth's flux lines. As the generator may be placed anywhere on the airplane, however, the best magnetic location can be selected, and such errors may be minimized and in most installations can actually be ignored. Non magnetized ferrous materials in the vicinity of the generator have much less effect than upon a magnetic compass, since there is in the generator nothing to induce magnetism in the surrounding material.

The Earth Inductor Compass has the further advantage that its characteristics may be independently adjusted. This is not possible in a magnetic compass where the period, inertia and damping are inseparably inter-related. Much more accurate reading is possible with the inductor compass than with the magnetic type. The heading may be set to one-half of one degree and departures of less than one-half degree from this heading are easily noted on the meter.

Used by Famous Pilots

The Pioneer Earth Inductor Compass was used by the Round-the-World Flyers, by Lieutenant Maughan on his Trans-continental Flight, by the Shenandoah and by Charles A. Lindbergh.

Guggenheim Fund Aids Greenland Weather

Dr. William H. Hobbs, professor of geology at the University of Michigan and director of the University of Michigan's Greenland expeditions, sailed on the steamship Frederick VIII, from Hoboken, N. J., at noon, May 10, to establish a permanent weather station in Greenland, from which warnings of North Atlantic storms by radio, at least two days in advance, will be forecast. It is thought these storm warnings will be of great value to air pilots.

Dr. Hobbs expects to begin transmitting weather reports on a short wave transmitting apparatus some time in July. He will return to the United States at the end of the Summer, but will leave a meteorologist and a wireless operator in Greenland all Winter. They will live in a hut anchored to a rock on a mountain 3,000 ft. high, where the full force of the wind can be observed.

The Daniel Guggenheim Fund for the Promotion of Aeronautics has donated $5,000 to the expedition because of the value it will have to aviation. The Rumanian Greenland expedition, headed by Dr. Constantine Dumbrava, will cooperate with the University of Michigan expedition, and will establish a base in the southeastern part of Greenland. The German Oceanographical Institute of Hamburg will send Dr. Georgi to Iceland to carry out balloon studies in cooperation with the American expedition. Dr. Hobbs will use pilot balloons to study the direction of the upper air currents and will send up sounding balloons and captive balloons with self-recording meteorological instruments.

Haskelite Plywood Makes a New Record

Haskelite plywood, well-known in the aircraft field, has added a new record to its string. In addition to being used in the Curtiss NC Trans-Atlantic planes in 1919, the Douglas world cruisers in 1924 and four Loening goodwill planes just returned from South America, it has the honor of forming a considerable part of the structure of the Ryan monoplane used by Colonel Lindbergh in his New York-Paris flight.

In the "Spirit of St. Louis," Haskelite, only one-eighth of an inch thick, is used for the wing beams and is also used for the leading edges because it is strong, rigid, light, and easily curved to the exact requirements of the design. Many portions of the cabin are built of Haskelite.

Haskelite is a material made of thin sheets of wood glued together. The strength of wood along the grain is much greater than that across the grain. Plywood is much stronger than wood because the plies are laid with the grain at right angles, thus giving an equal strength in all directions. Blood albumen glue is used as it is very highly resistant to the influence of change in temperature and the softening effect of water. One grade of plywood has been boiled in water without separating the plies.

C. A. T. Inc. Organizes Subsidiary Company

Major General John F. O'Ryan, president of the Colonial Air Transport, Inc., which operates the route between New York and Boston, via Harford, announced recently the organization of a subsidiary company, the Colonial Western Airways, Inc., to develop air routes through the Mohawk Valley, including one from New York to Montreal, and one from New York to Buffalo, via Albany, Schenectady, Utica, Rochester, and Syracuse. The new company, it is announced, will be controlled by substantially the same group as now control the Colonial Air Transport, Inc., and the officers will include: Major General O'Ryan as president, Col. Leonard S. Horner, vice president of the Niles-Bement-Pond Co., as vice-president, Sherman M. Fairchild, president of the Fairchild Aviation Company, as secretary and William A. Rockfeller of New York as treasurer.

The company will join in transportation schedules with the Ford Company whose planes will link up with the eastern planes at Buffalo. In addition to mail and express matter, passengers will be carried over the new routes, utilizing the latest multi-engined airliners having a capacity for 10 passengers in addition to mail and express. All of the company's air-craft are equipped with Wright "Whirlwind" engines of the type used by Captain Lindbergh in his Trans-Atlantic flight.

Property System for Air Corps

A committee has been appointed by the Chief of the Field Service Station, Fairfield, Ohio, to report upon a new property accounting system for the Air Corps. This Committee which acted under instructions from Capt. Shirns A. Blair, consist of Messrs. William D. Kennedy, Charles H. Calder, Leon W. Armour, Walter M. Moore and William O. Cooper.

Their report was submitted to Captain Blair early in May and will be used as the basis for a new and simpler system, by which much of the information needed by the field service section will be received from the depots, fields and stations on one reporting form. By means of this form, statistical records will be obtained pertaining to receipt and issue of supplies, and the purposes for which issued. The new scheme will be tried at two or three stations before being submitted to the Air Corps at large.

In order to obtain information regarding the actual working of property reporting systems in other branches of the War Department, Captain Blair left recently to visit representative ordnance and quartermaster depots to confer with supply officers who have had long experience in the installation and supervision of supply systems.

Foreign Aeronautical News Notes

By Special Arrangement with the Automotive and Transportation Divisions, Bureau of Foreign and Domestic Commerce

European Air Mail

This Post Office Department has been advised by the Postal Administration of Great Britain that the Air Mail Service on certain routes, which was suspended during the Winter, has been reopened An Mail Service between London and various European cities is as follows:

A Leave London daily except Sunday at 6 a. m. for France and Switzerland, offering delivery in Paris and Basle the same afternoon, and in Zurich the same evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word "Express." The service on this route is liable to suspension during the Winter

B Leave London daily except Sunday at 11 a.m. for France, offering delivery at Paris the same evening

C. Leave London daily except Saturday and Sunday at 2.45 p.m. for Germany, Czechoslovakia, Austria, Hungary, Jugoslavia, and Rumania, offering delivery at Nuremberg, Germany, the next morning, at Prague and Vienna the next afternoon, at Budapest the next evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word "Express," and delivery at Belgrade and Bnearest the next day but one. Services on this route are liable to suspension during the Winter

D Leave London daily except Sunday at 6 a. m. for Belgium and Germany, offering delivery at Brussels and Antwerp the same afternoon or evening; Cologne same afternoon, at Frankfort on the Main the same afternoon; and at Munich the same evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word "Express."

E. Leave London daily except Sunday at 6 a m for the Netherlands, offering delivery at Amsterdam and Rotterdam the same afternoon

F. Leave London daily except Sunday at 6 a.m for Germany, Denmark and Sweden, offering delivery at Hamburg, Copenhagen, and Malmo the same evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word "Express." The part of this route beyond Hamburg is liable to suspension during the Winter.

G. Leave London daily except Sunday at 6 a.m and at 12 noon on Saturdays for Germany and Danzig, offering delivery at Hanover and Berlin the same afternoon or evening, if an additional express fee of 12 cents per letter is prepaid and the cover is prominently marked with the word "Express;" and delivery at Danzig and Konigsberg, Germany, on the next morning

H Leave London daily except Sunday at 6 a. m. for Lithuania and the Union of Socialistic Soviet Republics (Russia), offering delivery at Kaunas, Lithuania, the next day, and at Smolensk and Moscow on the next day or next day but one. This route is liable to suspension during the Winter.

I Leave London daily except Sunday at 6 a. m. and 6 p. m. for Morocco and western Algeria, offering delivery at Tangier and Casablanca on the evening of the second day after dispatch, and at Oran on the evening of the second or morning of the third day from London

J Leave London each Wednesday at 6 a. m and each Thursday at 6 a. m for Senegal, offering delivery at Dakar, Senegal, in four days from the time of the Wednesday dispatch.

The Air Mail postage required, in addition to the international letter rate of postage, is as follows

On letters to France, Belgium, and the Netherlands, 4 cents for each ounce or fraction thereof; to Switzerland, Germany, Danzig, Austria, Hungary, Czechoslovakia, Sweden, and Denmark, 6 cents for each ounce or fraction thereof; to Yugoslavia and Rumania, 8 cents for each ounce or fraction thereof, to Lithuania 12 cents for each ounce or fraction thereof; to the Union of Socialistic Soviet Republics, 16 cents for each ounce or fraction thereof, to Morocco and western Algeria, 7 cents for each ounce or fraction thereof; and to Senegal (Dakar), 24 cents for each ounce or fraction thereof, the air mail fee and the postage to be fully prepaid by postage stamps affixed to each piece.

Mail matter intended for dispatch by the above mentioned Air Mail Service should be prominently marked in the upper left-hand corner of the envelope or cover with the words "Air Mail—London to Continent," so that the articles in assorting may not be overlooked

Articles for Morocco and western Algeria should, in addition, be plainly marked immediately below the above mentioned marking with the indication "Par avion de Toulouse" (by airship from Toulouse), and articles for Dakar should be marked in the same place on the cover with the indication "Par avion de Toulouse a Dakar" (by airship from Toulouse to Dakar)

All mail articles for this service will be dispatched to New York for onward transmission from that exchange post office

Norway to Have International Air Service

It is reported that Norway's first international air route will be inaugurated on July 1 with daily service until Oct 1. According to present plans the following schedule will be put into effect: Leave Oslo 7.35 a.m., Arrive Gothenburg 9.45 a.m.; Arrive Copenhagen 12.15 p.m., Arrive Stettin 3.00 p.m.; Arrive Berlin 4.40 p.m., Arrive Leipzig 6.15 p.m.; Arrive Dresden 7.35 p.m. The prices quoted passengers are as follows: Oslo Gothenburg 45 crowns; Oslo Copenhagen 86 crowns; Oslo-Gothenburg Stettin-Berlin, 158 crowns

The route Oslo-Stettin will be covered by the Deutsche Luft-Hansa with two engine Dornier-Wal seaplane having a seating capacity of eight passengers. The air route from Malmo to the Continent commences operation on April 19 with the following connection from Oslo: Leave Oslo 6.05 p.m. on the night tram to Malmo with air connection at 8.30 a.m. to Hamburg, Amsterdam, Brussels, Paris, London, and Berlin, Prague, Vienna and Munchen. All of these cities can be reached the same day. The cost of the Oslo-Paris trip including second class railway ticket and sleeper to Malmo is 285 crowns, to London 298 crowns, and to Vienna 247 crowns.

Connections will also be made with the large Berlin-Moscow route which will be covered by the new Junker machine with accommodations for twenty passengers

Alan Cobham Aviation, Limited

Under the title of Alan Cobham Aviation, Limited, a new aircraft company has been registered in London. It will manufacture aircraft. The company has a capital of £1,000 in £1 shares. Sir Alan Cobham is a director of the new company

Side Slips

By ROBERT B OSBORN

We take the liberty of reprinting the following story, which we think to be the best of the thousands of comments and stories concerning Captain Lindbergh's New York-to-Paris flight. It appeared in "The Conning Tower" edited by F. P. A., in the New York World issue of May 31.

"Last Friday, the story goes, Mr. Robert Benchley cabled Mr. Charles Brackett, who is in Paris: 'Any tidings of Lindbergh, left here week ago am worried.' Saturday Mr. Benchley received this cable: 'Do you mean George Lindbergh?'

* * * *

Mr. G. S. I says that its all very fine to be entertained by the best people of a number of countries, decorated by presidents and kings, have thousands of people waiting hours just for a glimpse of one, great fortunes within reach, and all that business, but he'd still rather be the world's oldest aviator than the most famous one.

* * * *

Among the bystanders who have been carried to fame by Lindbergh's successful flight we think that one of the least deserving is the lunch cart proprietor in whose wagon the flier bought a number of sandwiches to eat during the flight. According to the newspapers the business at the wagon has tripled since it was written up in connection with the flight, yet, if we remember the first reports correctly, the Captain was able to eat only one and a half of the sandwiches in thirty-three and a half hours.

When Lindbergh landed in Paris the news dispatches state that he was immediately besieged by a score of tailors who wanted to outfit him right on the spot, one of them promising to have a complete suit tailored and ready for him in fifteen minutes. We were very much relieved to find that the Captain did not accept this offer, as we once purchased a suit which must have been thrown together in less time than that, although we did not suspect that at the time we bought it. We can't say that it would have increased his popularity any to have a tronser leg or sleeve drop off during some serious state ceremony, or to have the breast of the coat come off in the hands of a general attempting to pin a medal thereon.

* * * *

We hope that in the excitement of watching preparations for the Trans Atlantic flights, we haven't missed anyone having delivered another electric stove for the first time in aeronautical history.

Aviation Activities at Yale

The Yale student group now consists of thirty-seven members of the Yale Aeronautical Society. Of this number, fourteen have been flying this Spring, amassing a total of thirty-one hours. Twelve men are receiving instruction at Brainard Field, Hartford, Conn., and two are learning to fly seaplanes at the New Haven Air Terminal.

The officers have attempted to make the weekly meetings of the society of general interest, not only to the members, but to the University in general. Several lectures have been given by authorities and men in contact with the industry. The interest shown by the faculty and undergraduates, as well as by the members of the local National Aeronautical Association branch, have been gratifying to the group.

AIRPORTS AND AIRWAYS

Boston, Mass.

By Daniel Rochford

A week of wide aviation interest is scheduled for Boston from June 26 to July 2 as the Massachusetts American Legion Aviation committee has cantered a group of events in a New England Air Mail Week.

Monday, June 27, is to be the occasion for a celebration on Boston Common with mail planes circling overhead. The state, city, post office, and army and navy will be represented by speakers and the Navy band will play. Captain R. F. Raymond, Jr., will preside.

Tuesday June 28 will be the Department of Commerce day with Col. H. H. Bliss giving an illustrated lecture at noon before the Chamber of Commerce and a large gathering of interested citizens.

Wednesday is the date for the arrival of the National Airplane Reliability Tour from Buffalo. Receptions at the airport, a dinner in town in the evening, and many private celebrations are planned. The tour is to depart the next day. Friday, July 1st is the anniversary of one year of air mail service to New England.

On that day Heustis I. Wells will fly the opening day's run of the mail brought in the anniversary plane. Letters will be carried to the governor and mayor and a special luncheon will be given down-town. Ceremonies will be held at the airport as the southbound plane leaves in the evening.

A new airport for Boston nears completion as the area on the salt marshes near the Wollaston Beach owned by Mr. Dennison is being filled. Franklin T. Kurt, former president of the Tech Aero Club, has associated himself with the new airport as manager. Pilot Boardman will do most of the flying. Kinner and Waco planes will be flown and solo Instruction, joy-hops, and special flying service will be available. Kurt is a Naval Reserve pilot, having graduated from both the Squantum and Hampton Roads courses. Dennison was for a time a student at Squantum. The airport already boasts a handsome hangar, fronting on the boulevard. A gasoline station attracts motorists and parking space along the sides promotes joy-hop business. The formal opening is set for early in July.

The Navy owns the adjoining salt marshes and it is hoped that they will lease additional runway space and permit sand pipe dredge lines to be run across to fill the added space.

Boston joined the million other communities asking Lindbergh to visit it. The Crosscup-Pishon Post of the American Legion at its annual open air boxing carnival at Braves Field June 13 staged a national tribute to Nungesser and Coli with a sunset formation of twelve service planes of the Army, Navy and National Guard passing over and showering roses. They had asked Lindbergh to attend but his New York plans interfered. The city of Boston through Capt. Gardiner H. Fiske, chairman of its air board, and Major Charles M. Wooley, National Guard Squadron commander who flew to Washington in a Douglas O2 June 10, sent an invitation by air to attend the Bunker Hill Day exercises June 17, a holiday in Massachusetts.

The Boston reserve army pilots have been doing twilight flying from the airport each Wednesday, continuing until dusk. There are no lights at the Boston airport for night flying.

On June 9 the Navy tried the same thing and a formation of three planes was out until it was dark, flying until well after 9 p. m. The Squantum pilots of the Navy also set the season record for Boston by exceeding one hundred hours time in a week again, doing 107 hr. the week ending June 4.

A dinner given to Edward P. Warner, Assistant Secretary of the Navy for Aviation, was a Boston feature the week of June 13. Its purpose was to encourage light plane competitions locally.

Air Service of New England, Inc., the Fairchild agents sent a new aerial photographer, Warren Colby of the Boston Transcript, to New York for a course of instruction with the Fairchild flying and photographic forces.

The Boston Airport Corporation is completing a thirty-five acre field at Nantucket Island. They have already flown several trips to the island and made the first official trip June 15. They expect to run daily flights beginning July. 1.

The Royal Blue Lines of Boston are running busses to the Boston Airport. They are also booking the Boston-Hadley Field and New York City flights over Colonial Air Transport's runs. The New York run is made in Fokker tri-engined planes and the Nantucket in a Stinson-Detroiter cabin plane.

Spokane, Wash.

An extensive construction program is now in progress for the 116th Observation Squadron. The State Legislature at a recent session appropriated $10,000 for the erection of an administration building. This building will house the offices for the administrative officers of the squadron, a squad room, with built-in lockers for men and a QM stock and supply room. These together with an assembly room for the officers, rooms on the second floor for the photo section and radio section, hot and cold showers for both officers and men, will make a very complete and up-to-date building. It will be constructed of brick.

A forced feed gasoline filling system is also in process of construction, comprising a 1,000 gallon tank and an electrical driven pumping arrangement with underground leads to outlet boxes on the line. Fifty-foot filling hose are provided for servicing ships on the line. In the past several weeks there has also been constructed an oil storage house and powder magazine.

The annual encampment of the 116th Observation Squadron will be held at Camp Lewis for June 16 to 30, inclusive. Artillery adjustment, Infantry contact, photo and other missions will be carried out in connection with other units of the Washington National Guard encamped at Camp Murry, adjacent to Camp Lewis.

Shockley Field Notes

By Harold M. Barnes

Shockley Field acted as host on May 22 to a group of Army fliers who arrived to assist in the opening of the field. The local post of the American Legion had charge of the events and very ably handled the 10,000 people who flocked to the large field.

Lieutenants Hunting flying a Curtiss P-1B Hawk, Lampton a Boeing PW-9, and Gaines a Curtiss P-1B Hawk were the first to arrive from McCook Field. Soon after the pursuits had landed Lieutenants Sellers, Deater and Carpenter and Sergeant Frenzi landed in three Jennys from Stout Field, Indianapolis. Next, four planes from Fort

Harrison at Indianapolis arrived including Lieutenant Hunter and Sergeant Goldberg in a DH, Lieutenant Mike Noone and Sergeant Montanan in a Jenny, Lieutenant Genaro and Sergeant Tynan in a Jenny, and Lieutenant Stout and Sergeant Nicholson in a Jenny. The final arrivals were a formation from Chanute Field including, Lieutenant Hart in a Douglas S2-C, Lieutenant Robeson and Sergeant Ritter in a DH, Captain Galloway and Sergeant Koontz in a Douglas C2-C, and Captain W. F. Donnelly and Sergeant Gordan in a DH.

The afternoons program featured formation flying by the Chanute and Indianapolis pilots. The three pursuits from McCook Field claimed the attention of the crowd for a half hour with their thrilling maneuvers. A daring parachute jump brought the climax of the afternoons program to a close. Clyde Shockley, manager of the field, had his two Standards on the line to take up passengers. Lieutenant Dexter flew one plane for Shockley. In the evening the various army pilots departed for their home stations.

On Monday May 23, a small cyclone visited Shockley Field demolishing Shockleys' two Standards and an Army Jenny which Lieutenant Genaro was preparing to take off for Indianapolis. Three days later Shockley had a new Swallow on the field having purchased one from the Muncie Aerial Company at Muncie, Indiana. Only Wacos and Swallows will be used by Shockley for his commercial work.

Among recent visitors who have landed at Shockley Field are: Louis Meister and Cliff Durant, in a Whirlwind Airster, Ralph Lockwood, in a Whirlwind Travel Air, Leroy Davis and Longbreaker, in an Air-King, George Anstgen and Russell Hankforth, in a Standard, O. O. McVay, in a Waco, Russell Sheridan, in a Waco and E. E. Basham, in a Swallow.

Elliot Aerodrome, Hamilton, Ont.

The Elliot Airdrome is located at the northeast corner of Hamilton Bay on the Windermere and industrial sites situated on the Beach Road. A large modern hangar has been built to accommodate four of the Elliot air service machines and later more hangars will be built to take care of visiting planes and the new aircraft which will be added to the present equipment.

In addition to the large airport on the Beach Road, the Elliot Air Service has small fields with hangars for passenger carrying only, at such places as Clappison Corners, on the mountain corner of the Guelph highway, and at Niagara Falls on the River road, between the falls and Chippewa.

A large modern house is located on the airdrome for use as a club and boarding school for those taking the flying course.

Rocky Mount, N. C.

Eagle Flying Field is located one mile north of the city of Rocky Mount, N. C. It is 1,400 ft. long and 300 ft. wide. Planes can land from either north or south.

This field is owned by the Eagle Airplane Co., Inc., of which J. D. Winstead is proprietor and manager. As yet there are no hangars on the field, but visiting pilots can get accommodations. Pilots are invited to visit the field at any time.

The Eagle Airplane Co., Inc., is the agent in North and South Carolina for the American Eagle airplane.

Cleveland, Ohio

By Ralph F. Thomas

New York and Chicago Air Mail to Cleveland is keeping to schedule, both day and night on that part of the Trans-Continental Route.

The Cleveland-Pittsburg Contract Air Mail has had some bad weather for a start, but it is keeping up to schedule very nicely.

The Er Express, operated by the Embry-Riddle Co., from Cleveland to Louisville, Ky., makes a one way flight each day.

Cleveland was host to four Latin-American aeronautic experts who are studying airplane manufacturing methods and landing fields in leading aviation centers of the United States.

The visitors were welcomed by Jack Berry, superintendent of the Cleveland Airport, when they landed after a pleasant flight from Detroit in a Ford tri-engined plane.

Cleveland is manifesting increased interest in aviation. One of the proofs of this is the large number of passengers and students who are accommodated every day by the Cleveland Air Service, Inc., and by private owners. Among the new students enrolled with the Cleveland Air Service, Inc., is Ted Hubbell, an insurance man of Cleveland.

Baltimore Air Show

The seventh annual Baltimore Air Show was held on Memorial Day at Logan Field under the direction of Major William D. Tipton. The program included many interesting aerial features, among them being parachute jumping, speed racing and stunt flying.

The main event of the day was a fifty-two mile race over a thirteen mile course for pursuit planes and was won by Lieut. Stephen A. McClelland, of the Marine Corps, who covered the course in 16 min. 33½ sec. with min. and 24 ½ sec. lead over Lieut. William G. Tomlinson of the Navy Air Service. Third place was won by Lieut. L. H. Sanderson. Because it was feared that an error in calculation had been made, a special race between the first two was held over a thirteen mile course with the result that Lieut. Tomlinson finished nine seconds ahead.

Captain Sanderson, who won first prize in the stunting contest, gave a very thrilling exhibition of stunt flying, performing such stunts as "double barrel rolls," nose dives, tail spins, falling leaf, etc.

Technical Sergt. Stuart G. Dietz won the parachute jumping event. Sergeant Dietz jumped from a height of 2,000 ft. and landed within 380 ft. of a 500 foot circle marked out on the Airdrome. All jumpers except one landed safely on the field, the exception being Corporal Bernard Walsh of Aberdeen who drifted a quarter of a mile and came near landing in the Patapsco River.

The National Guard race over a course of thirty-nine miles was won by Lieut. John A. Battle of the New York National Guard. Lieut. Carl J. Sacks of the same unit was second, Sergt. Samuel J. Davis of Aberdeen was third. The mixed relay race was won by the Navy team.

Central City, Ky.

Young's Flying Field, recently established at this city, is located in Muhlenburg County, between Central City and Greenville, the two largest towns in the county. There is an asphalt road between these places. The field is 900 by 1,500 ft.

C. C. Young does a passenger carrying business at the field every Sunday, using an OX5 Standard. Gasoline and oil service in any quantities are available and mechanical service can also be obtained.

Recently many planes have passed over this section, but none have landed. This is probably due to the fact that few pilots know the field and service are available. Pilots will be welcome to Young's Flying Field.

UNITED STATES AIR FORCES

Results of San Antonio Maneuvers

A source of gratification in the recent air maneuvers at San Antonio, Texas, was the ease with which an Air Corps staff and an Army staff that had never operated together could carry on without confusion or any material differences

of opinion concerning principles involved or the details of staff operations.

The formation flying at night by the Bombardment Group to distant objectives clearly demonstrated that night attacks by bombardment can be made in formation. The individual flying ability of Army Air Corps pilots and the flying training of the various units justified the belief that, man for man and unit for unit, they are unexcelled.

The concentration well demonstrated the military value of airways. But for the development of commercial flying facilities throughout the United States, it is very doubtful if the concentration could have been efficiently completed. The availability of these facilities enabled alterations to be made in original schedules to meet unforeseen conditions arising as the result of floods in the Mississippi Valley and of unusual rains and storms in the middle west, and permit the arrival at San Antonio of nearly all the planes as scheduled.

As the actual maneuvers did not take place until several days after the arrival of the Air Corps units at San Antonio, the time intervening was utilized to enable the units to complete their organization and check their equipment, to test certain formations developed by the Pursuit Group for attack on bombardment and attack formations and by the latter for defense against such attacks; to test the ability of units to operate quickly by practice at intercept problems; and to test the training of the units in timing their operations by means of a concentration problem.

A successful air review was held in which there participated over two hundred airplanes, comprising the aircraft concentrated for the maneuvers and such as could be made available by the Air Corps training center. Special demonstrations involving attack by aircraft upon marching troops of the Second Division were held at Camp Stanley. A demonstration was also held involving the use of a smoke screen to cover an attack by friendly troops.

During the period of the Joint Maneuvers, May 15 to 19, a total of 430 missions were scheduled for the Air Corps units, of which number 425 were completed, or 98.8%. The First Pursuit Group performed all of their 148 missions; the Second Bombardment Group completed 112 out of 114 missions; the Third Attack Group, 108 out of 110 missions; the Sixteenth Observation Squadron 22 out of 23 missions, and the Twelfth Observation Squadron all of 35 missions. No airplanes were out of commission on 9:00 a.m., May 19. Two airplanes were unable to take off on scheduled mission; two were compelled to leave mission and land on a home airdrome and two were compelled to make forced landing away from their home airdrome.

One of the features connected with the maneuvers was a demonstration of the rapidity with which mapping could be performed by means of aerial photography in conjunction with the Corps of Engineers. The enemy sector, approximately 110 sq. mi., was mapped within the space of two days. By ordinary methods this project would have taken weeks to perform. At 8:00 a.m., May 16, the First Photo Section, attached to the Second Division, Air Corps, started making photographs for a mosaic map of the enemy's sector. This mission was completed at 1:00 p.m., a total of 164 negatives being made. Two prints from each of these negatives were ready for delivery at 3.25 p.m. At 4:00 p.m. they were delivered to the Engineer Office, Eighth Corps Area, and from these photographs the Engineer Corps prepared and printed a map which was ready for distribution at 5:30 p.m. the following day.

There were thirteen foreign representatives present at the maneuvers, from France, Italy, Germany, Canada, Japan, Argentina and Mexico. The Secretary of War and General Mason M. Patrick, Chief of Air Corps, were present during the major part of the maneuvers, as were also the Hon. F. Trubee Davison, Assistant Secretary of War for Aviation, the Chief of Coast Artillery, the Chief of Field Artillery; the Chief of Cavalry, the Chief of Chemical Warfare Service; instructors in cavalry, field artillery and Air Corps from the General Service School, Fort Leavenworth; and two observers from the Navy.

Aero Corp. Has Successful Year

While the Aero Corporation of Los Angeles, Cal., has been operating little more than a year its success has been phenomenal. The company now handles the Eaglerock plane for Southern California and Arizona, Fokker planes for the entire Pacific Coast, is engaged in all phases of commercial flying and conducts a most up to date flying school with more than sixty-five students enrolled. All of these operations are carried on in a spirit of business enterprise, organization and efficiency and the result has been such rapidly increasing favor with the flying public that present plans soon to be announced will not only vitally interest western fliers but will also be of importance to the industry.

Lieut. Jack Frye, is president and Chief Pilot and he is the guiding spirit of a group of air-minded young men which includes, Richmond A. Edwards, vice-president and field manager; Walter A. Hamilton, vice-president and shop superintendent; Charles Cradick, secretary; Lieut. Paul Richter and Lee Woolley, pilots, and Miss Velma Dunlap, business secretary.

The field, hangars and shop are located on the west side of Western Ave., southwest of Los Angeles, about three miles. The hangars are on the south edge of the field which runs east and west. A wind cone is located at the hangars.

In order to care for the business which has been the result of handling Fokker and Eaglerock sales the company has installed a large new hangar with the most up to the minute shop in the west adjoining. The shop and the hangar are connected by an overhead trolley, which greatly facilitates engine installation.

A good example of the manner in which this organization has sought to cooperate with the Los Angeles people is shown in the activities of the Aero Corporation in connection with the observance of Boy's Week by the local schools.

Thursday, May 5, was designated as Boy's Day at the field as it was also Boy's Day in the city, county and state. A boy was placed in charge of the field for the day while a second boy, Lane Jenkins, was sent over Los Angeles as air traffic cop and also was commissioned to drop a letter from Chief of Police Davis to the acting Boy Chief, Merritt Rachou.

This stunt resulted in much favorable publicity in Los Angeles newspapers and brought several hundred high school boys to the flying field during the day, seventy five of whom actually went up on sight seeing trips over the city in Alexander Eaglerocks.

The present situation of the Aero Corporation shows sixty-five students enrolled in the flying school, four hundred and seventy-five paid passenger flights for the month of April and more than twenty five Eaglerock planes either delivered or contracted for, as well as two Fokker Universals which have been delivered.

Officials of the Aero Corporation of California are well pleased with the success which has attended their efforts to establish aviation in the minds of the people of Los Angeles as a substantial business enterprise. Although the volume of business which has been the result of sane business methods has been gratifying yet the most significant feature of this company's operation is that it is dealing more and more with people who are vitally interested in aviation as an every day occupation or future utility. Through its operations a growing demand for passenger and freight air lines between important western cities is being evidenced and an increasing willingness to concede the safety, reliability and comfort of air transportation has been the result of more than eight thousand paid passenger flights by the Aero Corporation during 1926 without a mishap of any character.

Past operations have proved that commercial aviation with new production equipment is established on a business basis and so well established that important announcements of further expansion are looked for within the very near future.

INDEX TO ADVERTISERS

PUBLISHER'S NEWS LETTER

No more brilliant editorial has appeared on Col Charles A Lindbergh than the splendid tribute written by W. O McGeehan, Sports Editor of *The New York Herald Tribune* It was titled "The Perfect Sportsman" and is worthy, by reason of its sheer inspiration, to take its place among the most effective Editorial writings of our time.

* * *

THE PERFECT SPORTSMAN

It has been written that the test of true sportsmanship comes in defeat. This is a popular fallacy. The test of the sportsman comes in victory and in the aftermath.

Consider the case of young Captain Lindbergh, of whom they say he is the finest ambassador of the United States. His smile, which is the frank and fearless smile of a boy, has found a response in the real heart of France. Its brightness has dissipated any clouds of misunderstanding that threatened to rise. This is because he is a sportsman born to be victorious and therefore prepared to be magnificent in victory

Go over your world heroes in the making and figure to yourselves how many of them remained magnificent when they were made It is no congenial task examining the idols to discover signs of feet of clay. Already sufficient time has passed for critics to find some indication of failure in the man to measure up to the deed—if there had been any weakness there.

But it seems that in the hour of victory, which is a more trying time than the hour of defeat, young Lindbergh instinctively makes the correct gesture. They marvel at his bearing. They marvel at his sense of the fitness of things.

They forget that young Lindbergh has been up among the gods while the world spun beneath him. Blessed with clear, discerning eyes of youth, he could look down and adjust his perspective as no mortal who did not dare wing his way to those heights could do He saw the world beneath him and measured it for what it was worth, without cynicism and illusion

For this work he was equipped in the first instance with the terrible wisdom of youth, or he would have brought down nothing with him after soaring over the way of the gods. Because he was so equipped he brought down with him understanding, even as the young Prometheus brought down the flame. And so young Lindbergh acts and speaks as one who has added to the wisdom of his age the understanding of one who has seen the world from afar off

There is no faith left in the studied phrases of the diplomats. All who listen know that behind them there is the cynicism of age, there is the hypocrisy of the self-seeker, there is the malice of the wrongdoer or the wronged. The spoken word is distrusted because the diplomats have spoken so often, and so often their phrases have been meaningless or worse.

But the world can understand that universal sign language of which the most eloquent phrase is the magnificent gesture such as young Lindbergh's.

Behold Lindbergh now passing through the ordeal by fire, the white-hot flames of success. It is in this sort of crucible that you find the true metal of which your man is made.

They are piling the brands of their adulation around him They are trying him with flames of sudden wealth. They heap honor after honor upon the blazing pyre until if there were any dross in the metal it could not fail to show. In the white heat of that pyre that fine, boyish smile remains unchanged The wisdom of youth lingers and with it the greater understanding won from the gods of the upper air He still speaks and acts as one inspired by these two factors

Hermes, of the winged feet, alighting on a "heaven kissing hill," never carried a more important message even from Olympus, than did his successor, young Lindbergh. And not the least significant part of the message is that it took the clear eyes of youth to see the way and the indomitable spirit of youth to keep on it to the end

Still puzzling over the achievement and the bearing of young Lindbergh after it, they have agreed that it was the deed of a sportsman Accepting this, Lindbergh has more than dignified what we call sportsmanship This, the perfect sportsman has made a godlike quality in showing how a sportsman should win

THE SENSE OF VALUES

Will this achievement and the bearing of the sportsman who woo the greatest sporting victory bring about a sane sense of values? I doubt it, because the world is old and sees hazily through the film that comes with age, and its comparative senility cannot grasp things with the clear-eyed wisdom of youth.

Only a few dared quote odds after young Lindbergh had disappeared into the mists that still hide the free spirits of Nungesser and Coli. They had calculated that his chance of ever coming down from those heights alive was one in fifty. But even as they quoted the odds they were awed by something they could not understand. It was that smile of Lindbergh's, for in it there was that terrible wisdom of youth, a wisdom baffling their arithmetic.

This was a magnificent gambler whose daring they could not comprehend It was not the bravado of desperation. It was not the empty impulse of a fool. They never could fathom the purpose that led him to dice with death

A younger world would come nearer to grasping the meaning of young Lindbergh's gesture. At his departure they might have said, "Prometheus has flown upward to bring down the fire" Or at landing they might have said, "Here Hermes alighted, descending with a message from the gods, for here is the imprint of the winged foot"

Where to Fly

CONTINUED

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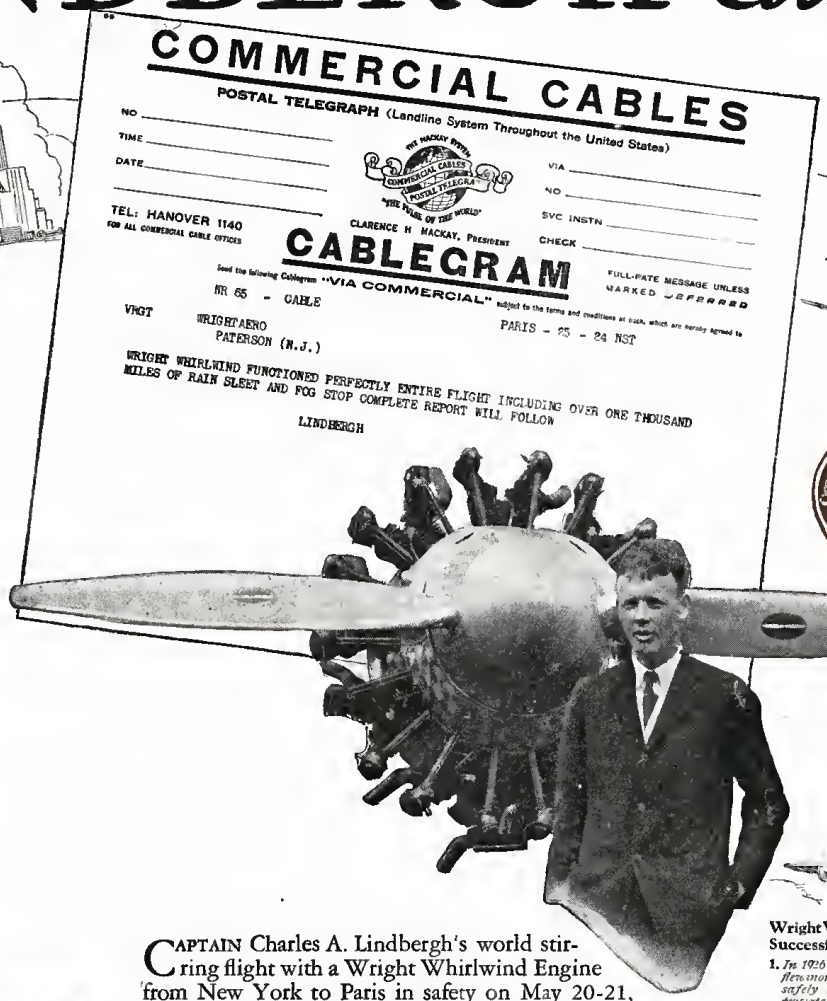

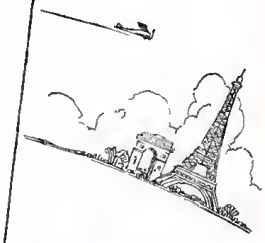

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